PUBLIC UNIVERSITIES EMPLOYEES PERCEPTION OF ELECTRONIC INFORMATION SHARING BETWEEN UNIVERSITIES AND THE MINISTRY OF HIGHER EDUCATION AND SCIENTIFIC RESEARCH

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Abstrak

Perkongsian maklumat ber-elektronik memberi faedah kepada organisasi dan institusi dalam pelbagai aspek termasuk meningkatkan tahap ketepatan maklumat dan ketepatan masa, meningkatkan kebertanggungjawaban dan pembuatan keputusan, dan meminimakan kos pengurusan maklumat. Terdapat tahap perkongsian maklumat yang tinggi di antara universiti awam di Iraq dengan MOHESR, bagaimanapun wujud limitasi dalam perkongsian maklumat secara -elektronik antara mereka, yang membawa kepada kesukaran dan kelewatan dalam membuat keputusan. La juga memberi cabaran dan halangan dalam menyokong prinsip desentralisasi yang diamalkan oleh universiti awam dalam tadbir urus universiti. Maka, terdapat keperluan menjalankan satu kajian mengenal pasti langkah dan strategi untuk meningkatkan perkongsian maklumat ber-elektronik antara kementerian dan universiti. Objektif utama kajian ini adalah untuk mencadangkan satu model perkongsian maklumat secara-elektronik di antara universiti awam di Iraq dengan *MOHESR*. Pensampelan bertujuan dan analisis regresi linear berganda digunakan untuk kutipan dan analisis data. Sejumlah 660 soal selidik telah diagihkan di lima universiti di Iraq dan soal selidik yang dikembalikan ialah sebanyak 274 (42%). Dari 16 faktor yang dicadangkan, sepuluh faktor didapati signifikan iaitu keupayaan IT, kualiti maklumat, keserasian, kerumitan, gudang data, pengurusan atasan, polisi / rangka kerja legal, kepercayaan antara agensi, kepimpinan tingkat atas, dan rangkaian sosial. Berdasarkan pada dapatan kajian, kajian ini menyediakan satu model perkongsian maklumat secara elektronik di antara universiti awam di Iraq dengan MOHESR. Satu kefahaman yang luas ke atas model ini akan menyumbang kepada peningkatan perancangan dan pelaksanaan universiti awam berkaitan tiga dimensi; teknologi, organisasi dan alam sekitar, dalam usaha mengimprovisasi perkongsian maklumat secara elektronik di masa hadapan. Berdasarkan pada dapatan kajian, dapat disimpulkan bahawa tiga dimensi dan sepuluh faktor dapat meningkatkan perkongsian maklumat secara elektronik di antara universiti awam dan MOHESR.

Kata Kunci: Perkongsian maklumat secara elektronik, Kualiti Maklumat, Gudang data, Kepercayaan di antara agensi.

Abstract

Electronic information sharing benefits organizations and institutions in various aspects including increasing the level of information accuracy and timeliness, improving the accountability and decision making, and minimizing the cost of information management. There is a high degree of information sharing between Iraqi public universities and *Ministry of Higher Education and Scientific Research* (MOHESR), however, limited electronic information sharing exists between them, which brings difficulties and delay in making decisions. This limitation also creates challenges and barriers in supporting the decentralization principle taken by the public universities in universities' governance. Thus, there is a need to conduct a study to identify the possible steps and strategies to increase electronic information sharing between the ministry and universities. The main objective of this study is to propose a model of electronic information sharing between Iraqi public universities and MOHESR. Social Exchange Theory, Critical Mass Theory and Transactive Memory System Theory have been used to solve the problem and achieve the objectives. Purposive sampling has been used and multiple linear regression analyses were applied for data analysis. A total of 660 questionnaires have been distributed in five universities in Iraq and the returned response was 274 (42%). From the 16 factors proposed, ten factors are found to be significance which are IT capability, information quality, compatibility, complexity, data warehouse, top management, policy/legal framework, interagency trust, upper level leadership and social network. Based on the results obtained, the study presents a model of electronic information sharing between public universities in Iraq and MOHESR. A comprehensive understanding of this model will contribute to the improvement of the planning and implementation of three dimensions; technological, organizational and environmental of the public universities in their way forward to improvise electronic information sharing in the future. According to the findings, it can be concluded that three dimensions and ten factors can essentially increase the electronic information sharing among public universities and MOHESR.

Keywords: Electronic information sharing, Information quality, Data warehouse, Inter-agency trust.

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CHAPTER ONE

INTRODUCTION

1.1 Research Background

Information sharing is one of the important aspects that improve the quality of businesses and organizations. Furthermore, with the advent of information and communication technology (ICT), the trend of sharing has moved to electronic information sharing, which is increasingly needed to support decision making in any government agencies, link government agencies including universities. Universities play an important role in any country for the development and enhancement of the quality of human, society, and nation; thus, universities have its rule and control. The Iraqi Ministry of Higher Education and Scientific Research (MOHESR) has decided to give the ability to make decisions to its universities to assist them making their decisions and rule by themselves. Unfortunately, not all the Iraqi public universities have full control to make their decision because of the limitation of resources and experiences (MOHESR, 2012). Several studies, however, have indicated that it is essential to provide a better quality of education for students and to deliver better services to staff of public and private sectors (Engah, 2007; Al-Sail & Atwan, 2010; Mohammed, 2010). Nowadays, there is a need for better decision making, in order to support the decentralization in these universities (Al-Sail & Atwan, 2010). Moreover, according to Akbulut (2011), electronic information sharing can provide better and effective decision making. Therefore, this study focuses on electronic information sharing between public universities and MOHESR in order to support decision making in these universities.

The first chapter starts with the research background on Iraqi public sectors and electronic information sharing. It follows with a discussion on technologies involved in electronic information sharing, such as data warehouse technology. Moreover, it identifies the centralization and decentralization principle in the public sector. The chapter continues with the problem background and research problems and follows with research questions and research objectives, the importance of the study, the significance of the study, limitation and scope of the study, and finally the organization of the chapters.

1.1.1 Higher Education Sector in Iraq

In the early 1970s, the Ministry of Education and Ministry of Higher Education in Iraq used several strategies and techniques to improve the education sector, such as offering free education to all local students at all levels, namely, primary school, secondary school, high school and university, and requiring the parents to send their children to school until 12 years old. During that time, the Iraqi education system was an example of the quality of education in Middle East education, and the country was the destination of choice for students from many parts of the world (Ihsanoglu, 2007). This trend resulted in a higher quality of education as well as an increase in the number of students and academic responsibilities (UNESCO, 2011). However, the Iraqi education system collapsed in mid-1980 due to the Iraqi wars (Paanakker, 2009).

After 2003, the higher education sector in Iraq obtained more attention from the government because of the increased need to supply good services to the huge number of students, as well as the increase in the number of government universities (from 17 in 2003 to 25 in 2010) and colleges (from 13,000 in 2003 to 36,000 in 2010, 147),

within increasing in the number of students (from 94,234 in 2003, to 123,339 in 2010 to 150,000 in 2013) (Al-Ani & Al-Naami, 2013). According to the Iraqi Minister of Higher Education Ali Al-Adeeb, the vision of Ministry of Higher Education in Iraq is to open more schools in every university and also open a new university in each state in Iraq. This vision aims to provide more seats for students in both the old and new universities and to augment the capacities of Iraqi higher education to be enough for the growth of Iraqi student (MOHESR, 2012).

Ministry of Higher Education and Scientific Research uses ICT to provide electronic services for employees and students (Alhadithi, Idrus&Elameer, 2011; Elameer&Idrus, 2011), such as e-education projects to provide e-services to administrative and academic staff, and students (E-Iraq, 2012). The e-services that MOHESR provided are web services, e-application for student, e-learning (Avicenna project) and electronic management information system for the staff (E-Iraq, 2012). The huge growth in the higher education services has demonstrated to the need for more information (UNESCO, 2011). The e-services provided by MOHESR are the evidence of some practices of electronic information sharing in higher education sector in Iraq Thus, the increment of electronic information sharing between Iraqi public universities and MOHESR is very important (MOHESR, 2004; UNESCO, 2011; E-Iraq, 2014).

1.1.2 Electronic Information Sharing in Iraq

In the public sector, information is considered as the most important resource (Yan, Sun & Wang, 2009). Governmental information sharing is the ability of public organizations to obtain, apply and process information in a society with citizens (Estevez, Fillottrani & Janowski, 2010). The first definition of information sharing was by Dawes (1996) when she defined it as an exchange of information among employees within and outside an organization or giving them access to information to effective decision making (Dawes, 1996). Information sharing provides many benefits, such as integrate services, enhance policy making, improve decision making, high product quality, reduce process work, develop the formulation and, implement and evaluate the organization's policies (Yan *et al.,* 2009)

Electronic information sharing means share the information electronically by using ICT devices such as internet, email, phone, mobile, and websites (Akbulut, Kelle, Pawlowski, & Schneider, 2009). Electronic information sharing increases the information amount which can help the decision makers to make better decisions (Akbulut *et al.,* 2009; Bigdeli, Kamal & de Cesare, 2013b). Previous research has described three kinds of information sharing (Akbulut *et al.,* 2009); (a) intra-organizational information sharing, which describes the information sharing based on the person (individually), (b) inter-organizational information sharing, which focuses on sharing information among two or more organizations and (c) inter-agency/department information sharing, which focuses on sharing information within the organization and across its departments. This study focuses on inter- organizational information sharing between public universities and MOHESR in order to support

them making better decisions, provide high-quality education and enhance public service.

In general, Iraqi government needs to increase the electronic information sharing among its agencies to support the Iraqi e-services (Mahmoud, 2010; Husain, 2013; Ali, 2013). Iraqi public universities use ICT, such as the internet to get the information and knowledge for purpose scientific research, and also it uses to sharing information by universities staffs (Mehdi & Ahmed, 2011). In specific, according to Alhadithi, Idrus and Elameer (2011), and Al-Aqaby, (2012) Iraqi public universities need to share the information electronically with MOHESR to increase the amount of information, quality of information in each university. Thus, the electronic information sharing can improve the decision making in public universities.

Information sharing is based on sharing and accessing information from multi data sources, such as several databases, documents, images and text files. Therefore, these multi data sources are one of the electronic information sharing challenges because it provides limited accessibility and availability of information as well as unstructured and unintegrated information (Pardo and Tayi, 2007; Kamal, Singh & Ahmed, 2012; Bigdeli *et al.,* 2013b). Furthermore, information repository in different platforms might be available in one place and not available to others (Bhanti, Kaushal, & Pandey, 2011). However, the central information systems that use common data storage (such as data warehouse) assist government agencies in increasing information sharing among them (Yang, Zheng, & Pardo, 2012). The availability, accessibility, standard format, and structure of information that the data warehouse provides to the user can increase the electronic information. Therefore, data warehouse has been used instead

of multi databases to support information sharing (Cuiling, Tianhe & Guojun, 2006; Qi &Quan-hong, 2011).

1.1.3 Data Warehouse Platform

Data warehouse (DW) integrates government data and enhances the mode of accessing these data with the little amount of time (Liu & Li, 2009). It addresses the question of how to perfectly use the huge amount of current and historical data to support the decision-making process (Litan, Apostu, Copcea, &Teohari, 2011). Data warehouse likewise helps government organizations decrease cost, increase activities and become more effective (Zeng, Chiang, & Yen, 2003). Thus, it is ready to organize the requirements of information services and deal with the dynamic information of the government, which can improve the e-service level within the organization (Liu & Li, 2009).

The significance of data warehousing techniques for universities needs has emerged in the last few years because of the huge data and information in the education sector and the large number of departments within each university (Bhanti *et al.,* 2011). Data Warehouse provides users with data availability and easier accessibility (Connolly & Begg, 2010). Moreover, it can give the standard format for that information within the proper structure. According to Akbulut et al (2009), "Electronic information sharing can be accomplished directly (*e.g.*, electronic mail) or indirectly through an information repository (*e.g.*, data warehouse)". This is supported by Ariyachandra& Watson (2010) and Qi & Quang-hong (2011) who believed that data warehouse could increase the electronic information sharing among the users.

1.1.4 Centralization and Decentralization in Iraq

Centralization is a practice in which all government departments and agencies receive directives and orders from the center in Iraq (Shah, 2011). For example, Iraqi public universities have been centralized under the control of the Ministry of Higher Education and Scientific Research (MOHESR) since 1970, which decreased the opportunity for public universities to achieve education independence in Iraq. This principle is applied to several aspects including human resources, curricula, decision making, designation of staff and lecturers, and even acceptance of students for the universities (Harb, 2008). Several studies had come forward and offered opinions and advice to the Iraqi government to change its principle from centralization to decentralization (Said, 2011; Fadhil, 2011; Forster & Michell, 2011; Brinkerhoff & Johnson, 2009; McCluney, 2011).

The practices of centralization in universities in other countries also showed some limitation for development. Countries like Thailand and Pakistan still face many issues because of excessive centralization of authority and bureaucratic rigidity in its higher education sector (Kirtikara, 2012; Nayyar & Naqvi, 2013). In the era of 2000s, the public universities in Asia followed decentralization, deregulation, privatization, marketization and administrative reforms in higher education (Mok, 2003, 2005). For example, in South Korea China and Taiwan, decentralization processes were adopted in their university systems in order to make their students more creative, innovative and responsive to external and internal changes (Mok, 2007; Chang, Wu, Ching, Tang & Xiao, 2011). Decentralization principle is about a re-distribution of decision making (Rabinovitch, 2011; Fadhil, 2011). The main benefits of decentralization include more effective and efficient delivery of services and better provision of services, thus

providing the government agencies with greater opportunities to improve their situations (Cheema, 2011; Shah, 2011). In making universities being able to make their decisions independently, there is a need for them to have more opportunities for decentralization. Adopting strategies of decentralization in higher education sector means the Ministry of Higher Education needs to shift from traditional "state control model" into "state supervision model." The concept of decentralization does not mean to weaken the role of the Ministry of Higher Education because it will still play strong roles, such as monitoring, making rules and policies, allocating financial support as well as developing strategies and plans (Mok, 2008).

Since the previous regime until now, in Iraq, the MOHESR has followed the centralization principle in the academic, technical, and financial aspects (Ranjan & Jain, 2009; Said, 2011; Wilhelm, 2012). The students' application and decisions making of the universities were also centralized (Ranjan & Jain, 2009; Said, 2011; Wilhelm, 2012). This concept denotes that all Iraqi public universities receive orders and terms from MOHESR (De Santisteban, 2005; Kaghed & Dezaye, 2009; Harb, 2009; IIE, 2012; Wilhelm, 2012). According to Alhadithi, Idrus, and Elameer (2011), all Iraqi public universities have the same managerial structures because they follow the Iraqi higher education structure which makes no differences between the Iraqi universities. This way of leading Iraqi public universities by MOHESR has a detrimental effect on developing these universities (Harb, 2009). Therefore, to improve the entire Iraqi education sector, the higher education sector should go forward with the decentralization in the Iraqi education system to give more authorization for its universities to make their decisions depending on their situation and requirements (Harb, 2009; Al-Shouk, 2011; Lindsey, 2012).

The Iraqi Higher Education is looking forward to giving more responsibility and freedom to its universities by allowing them to create their decisions bases on their situation (MOHESR, 2012). One aspect is regarding having more information to support decision makings, and sharing information with MOHESR or with other agencies could help them a lot. Therefore, to support the decentralization principle in Iraqi higher education sector, information needs to be easily and quickly shared within the universities as well as with the MOHESR. There is a need here to increase the availability and sharing of information, and with the latest trend of ICT and Internet. Nowadays, electronic information sharing has been seen and believed to be the ultimate approach that could increase the information sharing and assist the process of decision makings in universities and between the universities and MOHESR.

1.2 Problem Background

According to Jing and Pengzhu, (2009), Estevez, Fillottorani and Janowaski (2010), Yang and Maxwell (2011), Kamal, Singh and Ahmed (2012), Bigdeli, Kamal, and deCesare (2013a), the limitation of electronic information sharing has negative effects on the decision-making process in government organizations. The lack of electronic information sharing among government agencies to a certain extent could risk the safety and security of one country and their citizens, as well as other human life. A terrified incident of the 11-September in New York illustrated a very good example related to some limitation of electronic information sharing among government agencies. There are many speculations about the incident including what kind of information agencies received and how much the government agencies know beforehand. There were rumors that some government agencies received information about the terrorist attack prior to the incident, while other agencies did not aware about

it (Akbulut, 2003; Atabakhsh *et al.,* 2004; Jing & Pengzhu, 2007a, 2009; Akbulut *et al.,* 2009; Abaas, Shibghatullah & Jaber, 2014). Risks could have been mitigated and the big losses could have been avoided if information can be early shared and electronically transferred among the agencies.

The diversity of resources where information is kept could challenge the use and practice of information sharing (Lam, 2005; Pardo and Tayi, 2007). One of the big challenges is when different organizations located at different locations rely on multi databases to share huge amounts of data and information. Information are stored in different formats and platforms (Bellamy and Raab, 2005; Nash, 2008). Thus they could not be transferred immediately. This scenario eventually produced slow and improper decision makings. The multi databases cannot provide compatibility standards of information system and information quality among organizations (Dos Santos and Reinhard, 2007).

Similarly, in Iraq the public organizations have the limitation of information where information is available only in some of the organizations (Al-Jubory, Al-Rubaay& Al-Ubidy, 2011; Faraj, 2013; Mohammed, 2013). The limitation of information has negative effect on decision making (Al-Jubory, Al-Rubaay& Al-Ubidy, 2011; Mohammed, 2013), which leads to waste of time, effort, and money (Mohammed, 2013; Al-Shimary, Al-Azawi& Al-Mashhadani, 2013).With this limitation, there is a need that Iraqi government should increase the electronic information sharing within and among agencies to support the Iraqi government system (Mahmoud, 2010; Al-Aqaby, 2012; Husain, 2013; Ali, 2013).

However, there is also limitation in electronic information sharing among the government agencies including in higher education sector (Al-Aqaby, 2012). In 2012, the Minister of Higher Education Ali Al-Adeeb permitted the Iraqi universities to adopt decentralization by giving them additional authority and responsibilities and allowing them to make their decisions. Some of public universities have difficulties to perform decision makings (MOHESR, 2012) due to several issues; for instance, lack of proper way to make good decisions with less of information (Husain, 2004; UNESCO, 2010; Fawzi & Said, 2011; Al-Shimary, Al-Azawi & Al-Mashhadani, 2013; Faraj, 2013).

The limitations in electronic information sharing were also associated with technology, IT skills and, the compatibility of software and hardware (Elameer & Idrus, 2010), lack of management and top manager experience (Elameer & Idrus, 2011b) and policy and rule (Alhadithi, Idrus & Elameer, 2011). The technological barrier of electronic information sharing in a government organization is considered as the main challenge (Pardo and Tayi, 2007; Jing, Pengzhu & Yen, 2014). This barrier refers to the lack of IT capability, low information quality and less compatibility (Pardo and Tayi, 2007; Bigdeli, 2012; Sayogo & Gil-Garcia, 2014). Moreover, the complexity of information sharing systems can also affect the use of electronic information sharing in the public sector (Akbulut, *et al.,* 2009; Akbulut, 2011; Yang, 2012; Yang, Pardo & Wu, 2014).

1.3 Problem Statement

Considering the mentioned worldwide problem toward electronic information sharing including the technological, organizational and environmental many factors have been investigated through previous research.

In specific, the limitation of electronic information sharing between the Iraqi public universities and MOHESR (MOHESR, 2004; Al-Ma'malji & Al-Rawi, 2005; Al-Fatly, 2008; Al-Shafia, 2010; Hamad & Asman, 2010; Alhadithi, Idrus &Elameer, 2011; UNESCO, 2011; Al-Aqaby, 2012) caused limited of information, which has badly affected decision-making processes in each university in Iraq (Alhadithi, Idrus & Elameer, 2011). Making a decision in public universities takes longer time because it needs general as well as specific information, guidelines and advice as well as approval from MOHESR. Thus, that affects student intake, staff recruitment, teaching and learning process while brings a negative effect on the administrative and academic development (Matab, 2006; Matab & Al-Atawi, 2007; Al-Nahi, 2011; Al-Dabagh & Al-Dabagh, 2013).

According to the interview with Dr. Ghassan Nashat Mohammed (2016, July, 15), the employee in the computer center in MOHESR, Kufa University, Babylon University and Karbala University are in the moderate level of electronic information sharing, but Al- Qadisiyah and Al-Muthanna Universities are still in poor level. He also mentioned that there are four main electronic information sharing barriers that higher education faces in Iraq are electronic information sharing, technical, organizational and environment. Moreover, the most challenges that higher education faced are; lack of top manager role and experience, lack of IT capability with its compatibility, weak

trust among employees. Additional, he said that there is a need for policies and rules to protect the employees while sharing their information electronically. Moreover, information that are shared between public universities and MOHSR mostly are not correct, or it is low quality (Ghassan Nashat Mohammed, 2016, July, 15). Finally, he mentioned that there are multi databases issues between public universities and MOHESR such as they face different format of the information that they share, and also each side use a different kind of software to share and store their information. (APPENDIX A)

In summary, the limited electronic information sharing between public universities and MOHESR is considered as a big challenge in supporting the universities' operations academically and administratively. This study, therefore, was conducted to investigate the factors that can increase electronic information sharing between each university in Iraq and the Ministry of Higher Education and Scientific Research. As technological is the most obvious challenge, this study includes technological point of view to solve the limitation of electronic information sharing in Iraqi higher education sector.

1.4 Research Questions

The research problems described earlier have created the following research questions:

1. What are the barriers of electronic information sharing between Iraqi public universities and MOHESR?
2. What are the factors that can increase the electronic information sharing between Iraq public universities and MOHESR?

3. What are the respondents' perceptions towards electronic information sharing between Iraq public universities and MOHESR?

1.5 Research Objective

The research is based on two main facts: first the failure of adopting decentralization principle in Iraqi public universities (MOHESR, 2012): and second, the complex decision processes together with the limitation of electronic information sharing between public universities and Ministry of Higher Education and Scientific Research (Alhadithi, Idrus & Elameer, 2011; UNESCO, 2011; Al-Aqaby, 2012).

The main objectives of this study are as follows:

1. To identify the barriers of electronic information sharing between Iraqi public universities and MOHESR.
2. To identify factors that can increase the electronic information sharing between Iraqi public universities and MOHESR.
3. To propose a theoretical model of electronic information sharing between Iraqi public universities and MOHESR.

1.6 Important and Usefulness of Study

Therefore, this study will support the importance of decentralization in Iraqi higher education sector. The support to decentralization principle is based on the ability to make good decision which depends on quality and availability of information. Universities will have difficulties in correctly making decisions if they have insufficient and inefficient information. Hence, the decentralization of universities requires a support of abundant information which can be accessed and shared at any time such as through electronic mechanism. Thus, this study proposes a theoretical

model to increase the electronic information sharing between Iraqi public universities and MOHESR by identifying the influence factors that increase the electronic information sharing between them.

1.7 Limitation and Scope

This study focused on Iraqi public universities that are governed under the Iraqi Minister of Higher Education. Moreover, these universities are none profit and more collaborative with government organizations and society. They apply the same policies and rules, and with a high number of students. There are 22 universities in all the 15 states of Iraq; with five universities in the capital of Baghdad, two universities each in six governances, namely, Najaf, Basra, ThiQar, Babylon, Babylon, and Salah Aldeen, and one university each in the remaining governances.

Five universities in five states in the Middle Euphrates region have been chosen, namely, the University of Kufa, University of Karbala, University of Babylon, University of Al-Qadisiyah, and University of Al-Muthanna (MOHE, 2013). For the purpose of this study, the scope is limited to those who have good interaction, communication and sharing with MOHESR (Al-Dhalmy, Al-Amarah, Afinan, and Al-Asadi, 2012). Moreover, the study focused on administrative staff who shares information electronically with MOHESR in these universities because these kinds of employees have a good idea and knowledge about the information sharing. The scope also focuses on vertical functioning information sharing between public universities and MOHESR in order to make better decisions, provide high-quality education and enhance public service.

Iraqi public universities have currently used multi-separated databases to support the e-services such as information management system and university website which are provided to the university staff, students and citizens (Hamad & Asman, 2010; Abbas, 2012). Current databases could have limited the use and sharing of information electronically between the universities and the Ministry. On this aspect, data warehouse platform is suggested instead of traditional databases with a consideration that it can encourage and increase the use of electronic information sharing. On this matter, this study included data warehouse as a potential technological factor to increase the electronic information sharing between Iraqi public universities and MOHESR.

1.8 Significance of Study

Electronic sharing of information can reduce the cost, time and effort of sharing the information. Moreover, it improves the decision making in order to enhance the universities services that can support the decentralization principle in Iraqi higher education sector. Therefore, this study determined the factors that increase the electronic information sharing on universities' environment. Consequently, a model proposed to improve electronic information sharing between Iraqi public universities and MOHESR. This theoretical model identified the factors that positively and negatively affect electronic information sharing between these universities and the Ministry which can be served as a roadmap for them.

1.9 Electronic Information Sharing Factors in Higher Education Sector

Electronic information sharing has influence several factors that can influence the participation positively and negatively. There are limited electronic information sharing researches that studied these factors in pulic sectors in different countires. Therefore, this study investigated sixteen factors in order to increase the participation of electronic information sharing between public universities and MOHESR, these factors are:

1.9.1 Benefits

Electronic information sharing helps the agencies achieve different kinds of benefits, such as decreased cost, time and effort, increased accuracy in collecting information, increased accuracy in timeliness, enhanced streamlining and management of operations, complete information to solve the problem, support decision making (Estevez *et al.,* 2010; Yang & Maxwell, 2011). Staff members in Iraqi public organizations have lacked a good understanding of the electronic information sharing benefits, which reduces the use of electronic information sharing in these organizations (Alwan& Abdurrahman, 2010; Ahmed, Jasem & Hassan, 2012).

1.9.2 Risks

Several huge risks of sharing information among agencies exist, such as making important information available to strangers (Estevez *et al.,* 2010). In many cases, information sharing systems have raised the issues of information theft and interruption while sharing the information (Jing & Pengzhu, 2009; Akbulut *et al.,* 2009; Yang & Maxwell, 2011). The risks are considered as the main factors for increasing information sharing among the Iraqi public organizations because government information is secured from threats and malicious acts, thus increasing the

level of trust and confidence between these organizations (Alwan & Abdurrahman, 2010; Abdul-Alrahman, 2011; Salman, Abdul-Majeed & Ismaeel, 2012; Ahmed, Jasem & Hassan, 2012; Al-Shakarchy, 2013).

1.9.3 Costs

The costs of electronic information sharing refer to the costs of obtaining the useful technology for sharing, including the system, installation, implementation, migration, integration, interface, training, maintenance, and communication costs (Landsbergen & Wolken, 2001; Akbulut, 2003; Jian & Pengzhu, 2007b, 2009). Information sharing with different agencies implies diverting the resources, which causes difficulty in sharing government databases. Thus, information sharing becomes extremely expensive (Dawes, 1996; Landsbergen & Wolken, 2001; He-jiang, 2010, Tie-nan *et al.,* 2010). Finance is one of the largest issues in Iraqi agencies because the money that the agency obtains is inadequate in purchasing hardware and software to develop a real platform for increasing electronic information sharing (Abdul-Alrahman, 2011).

1.9.4 IT Capability

IT capability pertains to the use of technological infrastructure and personal IT skills in government agencies in order to share information electronically (Jing & Pengzhu, 2009; Kamal *et al.,* 2012). The IT skills of staff and availability software and hardware have influential effects in and within the Iraqi public organization. The increment of IT capabilities in the public organizations in Iraq increases electronic information sharing (Alwan & Abdurrahman, 2010; Mahmoud, 2010). Moreover, the lack of infrastructure and a huge gap in the IT skills between government agencies are evident (Ahmed, Jasem & Hassan, 2012).

1.9.5 Information Quality

According to Klischewski and Scholl (2006), successful information sharing in inter-organizational collaboration strongly relies on the quality of the information. Recently, governments have started to pay more attention to information quality because a government decision can provide poor quality results if it is based on low information quality (Estevez *et al.,* 2010). In other words, any amount of information shared is useless without information quality. Decision makers in Iraqi public universities pay more attention to obtaining high-quality information because this approach allows them to make the best decisions (Muhii, 2009). Asim and Ibrahim (2013) indicate that decision makers in Iraqi public organizations require information quality in making decisions. Thus, Iraqi decision makers can obtain information quality by adopting information and communication technology, including the internet (Asim& Ibrahim, 2013).

1.9.6 Compatibility

Compatibility refers to the capacity to provide equal levels of software, hardware, and skills in each government agency (Estevez *et al.,* 2010; Lu, Liu & Pei, 2011; Bigdeli *et al.,* 2012), it consists of organizational and technical compatibility. Organizational compatibility pertains to the compatibility in the skills of staff at every level of government that can help in electronic information sharing (Jing & Pengzhu, 2007b, 2009; Akbulut *et al.,* 2009; Bigdeli *et al.,* 2013). Technological compatibility refers to the unification of information technologies (software and hardware) required from the staff to electronically share government information (Akbulut, 2003). Abdul-Alrahman (2011) cited the incompatibility of software and hardware as one of the

technical barriers and the incompatibility in staff skills and experiences as one of the organizational barriers in Iraqi public organizations.

1.9.7 Complexity

Complexity refers to the degree to which participation in electronic information sharing with organizations is perceived as a relatively difficult process (Akbulut *et al.,* 2009). There is complexity in ideas and/or processes of electronic information sharing (Akbulut, 2011). Moreover, technologies that used to adopt electronic information sharing might be difficult to implement and use (Akbulut, 2011). Iraqi organizations require consideration of a number of technical issues thus they need to include new change to their operational systems (E-Iraq, 2014). One of these issues is the complexity of data transformation in order to support the information sharing among government organizations' information systems (E-Iraq, 2014).

1.9.8 Data Warehouse

Data warehouse provides solutions for issues regarding electronic information sharing because the DW establishes a platform for achieving electronic information sharing (Cuiling, Tianhe& Guojun, 2006). According to Akbulut (2011), data warehouse can establish indirect information sharing. Government systems that rely on data warehousing techniques likewise enhance the effectiveness of huge government data increase information sharing, and support decision making (Huang, Dang, Cheng, Peng, & Zhu, 2010). According to Ahmed Jasem and Hassan (2012), Iraqi departments that belong to the same level should have a common database to foster information sharing and increase interaction. According to Hamad & Asman (2010), data

warehouse can enhance the performance of the Iraqi universities, increase the interaction among them and improve the quality of inserted information.

1.9.9 Top Management Support

Top management support refers to the support of top managers that can create a better environment in which employees are encouraged to share information with other agencies (Kamal *et al.,* 2012). Researchers have stressed that without the support of top management, the progress of government-to-government information sharing slows down (Jing & Pengzhu, 2007b, 2009; Estevez *et al.,* 2010). Top management support provides guidance that can help organizations cross the barriers of information sharing (Akbulut *et al.,* 2009; Lu, Liu & Pei, 2011). Alwan and Abdurrahman (2010) cite top management support as one of the important factors for the Iraqi public organization. Leadership is also necessary for encouraging the staff to participate and improve their skills and knowledge by sharing them with others.

1.9.10 Collaboration

Good network collaboration among organizations can increase and manage the delivery of public services (Gil-Garcia *et al.*, 2007), with information being shared efficiently. However, the willingness to share information happens when participants show their responses to other participants in other organization (Kamal, *et al.,* 2012). Iraqi government organizations need to increase the collaboration between them (Alwan & Abdulrahman, 2010). Moreover, this collaboration should not be only for information, but it should extend into visions, ideas, and investments.

1.9.11 Size

Size refers to the effects of organization size on electronic information sharing (Akbulut, 2010). Some large agencies viewed the initiative as a bottleneck to their operations because of the large volume of crash information that needed to be entered. Due to their heavy workload in other areas, they either chose not to share information electronically or were unable to enter information in a timely manner (Akbulut, *et al.,* 2009). However, some small agencies, especially those with supportive top management, were found to be more innovative and willing to share information electronically (Bigdeli *et al.,* 2012). Size of the organization is an important factor in information government and the way in which organizations deal with their information for their activities (Bigdeli, 2012). Therefore, this study suggests that the size of the university can affect the interaction and electronic information sharing with MOHESR.

1.9.12 Policy/Legal Framework

The government policies can decrease or increase the encouragement of using electronic information sharing among its agencies; thus, it has a strong effect on electronic information sharing across agencies, especially in the public sector (Gil-Garcia *et al.,* 2007). Jing and Pengzhu (2009) indicated that policy and law is one of the important factors in the electronic information sharing environment (Jing & Pengzhu, 2009; Bigdeli *et al.,* 2012). According to Abdul-Alrahman (2011), Iraqi government systems require new policies and laws to support agency employees because the policies and laws can increase authority and trust between the staff of agencies. Rules or laws that can protect the staff when they intend to share electronic information are inexistent (Alwan & Abdurrahman, 2010; Fadhelalla, 2012). The e-

Iraq has included in its future plan a strategy called “legal frames,” which provides any individual in Iraq with the ability to securely share his/her information (E-Iraq, 2012). The Iraqi government has developed the Government Interoperability Framework (GIF), a standard document on sharing e-information among government agencies (GIF, 2011). Thus, the current study considers policies and laws as important factors that provide additional security for university staff members when they electronically share information.

1.9.13 Interagency Trust

Interagency trust refers to the belief that the information has been sent to the right agency and is deemed to be useful to the agency. (Akbulut, 2011; Akbulut *et al.,* 2009; Yang & Maxwell, 2011). The main outcome of trust between government agencies is the provision of an optimistic staff behavior (Akbulut, 2003; Gil-Garcia *et al.,* 2009; Bigdeli *et al.,* 2011, 2013). Therefore, the leadership should recognize and protect the rights and interests of all the participants who can increase information sharing behavior (Akbulut, 2003; Jing & Pengzhu, 2009; Akbulut *et al.,* 2009). Trust is considered as one of the important factors; for instance, trust in Iraqi e-commerce positively affects the increase in trade exchange and information sharing among the dealers (Rashid, 2011; Ehsan, 2012; Al-Taie & Kadhim, 2013). Therefore, the Iraqi government should improve the trust among staff because trust is an important and essential factor among public organization (Abdul-Alrahman, 2011).

1.9.14 Upper-Level Leadership

Upper-level leadership refers to the capability of an external leadership to exert influence on its organizations to act in a prescribed manner (Akbulut *et al.,* 2009; Jing & Pengzhu, 2009). Moreover, upper-level leadership supports electronic information sharing by providing financial resources and management to develop this project (Jing, Pengzhu& Yen 2013). By following the centralization principle in Iraqi public organizations for a long time that gives the external leadership an interactive effect on its organizations (Alwan & Abdulrahman, 2010; Ali, 2013).

1.9.15 Critical Mass

Critical mass refers to the organizations that are currently sharing or will share its information by using electronic information sharing project (Akbulut, 2010). Organizations are affected by the acts of similar organizations when they made decisions to use electronic information sharing (Bigdeli, 2012b). If the organizations are successfully sharing information electronically that can help to motivate non-sharing organizations (Akbulut, 2009). This study suggests that the high numbers of participant universities can give more encouragement to share information electronically with MOHESR.

1.9.16 Social Network

Social network refers to personal relationships between inter-organizational (Jing & Pengzhu1, 2007a). It includes relationship, mutuality, long-term benefits, trust, favor, loyalty, concept of commitment and reciprocity (Jing & Pengzhu1, 2009). The good social network between inter-organizational can provide better trust environment and enhance the ability of cooperation in electronic information sharing (Jing & Pengzhu1,

2009; Jing, Pengzhu & Yen, 2013). A staff behavior has influence effect in Iraqi organizations (Abdul-Alrahman, 2011). There is a corporate culture which bases on the idea of respect and mutual trust among all staff in Iraqi organizations (Al-Tak & Al-Hayali, 2013), moreover, Iraqi organizations need to continue culturing their staff to increase their collaborations

1.10 Contributions of Study

The practical and theoretical contributions of this study are discussed in the next subsections.

1.10.1 Theoretical Contributions

In general, an extensive review of relative research on electronic information sharing among government organizations (horizontal and vertical) was so few. Thus, this study extends the electronic information sharing studies in order to provide more understanding about it in the public sector. In particular, best on the researcher knowledge, no academic research addressing the increasing of electronic information sharing in the higher education sector in Iraq (public universities and the ministry) had been conducted. Therefore, this research addressed this existing research lacuna, by developing a theoretical model in the higher education sector to understand better the increasing of electronic information sharing between public universities and, MOHESR.

The technology, organization, and environment framework has been utilized wisely in the information technologies and information systems studies in order to provide more explanation and understanding to the factors that influence the adoption of information technologies and inter-organizational information systems. However, the TOE framework has been used before only once in the electronic government study (Akbulut, 2011). Therefore, this research used the benefits of the TOE framework by adopting it in order to find new characteristics of electronic information sharing. This research extended the previous theoretical frameworks of electronic information sharing in order to apply several factors of electronic information sharing. It provided a solid foundation by investigating the factors that are supporting or not supporting the electronic information sharing in the public sector in general and higher education contexts in specific. Additionally, from the social exchange theory, upper-level leadership factor was found as affected factor to increase the electronic information sharing.

There are insufficient studies reported on the use of a data warehouse as a factor to increase the electronic information sharing. According to Akbulut (2003, 2011), data warehouse can increase the electronic information sharing by giving the authorized staff indirect access to the information. Moreover, the central information systems that use common data storage (*e.g.*, data warehouse) help the organizations in increasing information sharing among them (Yang, Zheng, & Pardo, 2012). Therefore, the data warehouse as a factor has been investigated in this study in order to find its influence in electronic information sharing in the higher education sector.

This research also provided support for many factors that have been investigated in the electronic information sharing, technology, organization and environment contexts of electronic information sharing in higher education sector. These factors can be used in the future studies of electronic information sharing. Moreover, information quality factor has been found an influence affects in a qualitative research of electronic information sharing in UK conducted by Bigdeli (2012). Thus, this study also found it influence in increasing the electronic information sharing. Moreover, the use of these factors needs to investigate more in the public sector in order to provide more understanding of its concepts in future researches.

1.10.2 Practical Contributions

The findings of this study are important and relevant in academic environments such as to the Iraqi environment including the Ministry of Higher Education and Scientific Research, policy makers, public universities, president, deans, IT managers' decision maker and the staff who share information electronically in these universities. Moreover, this research can add a significant contribution to the society in general.

Electronic information sharing between public universities and MOHESR can provide more efficiency in university operations and enhanced the services to the students and citizens. Government administrators noticed the usefulness of sharing information electronically in higher education sector. The significant benefits of this sharing can be used by policymakers in ministry and the public universities. The success of intra-organizational electronic information sharing needs more explanations and details about these issues together with a method to solve the matter. Thus, this study considered as the first step forward in order to achieve this aim.

This study can increase the electronic information sharing between public universities and MOHESR. It will be beneficial in increasing the sharing of information in the universities, which is later used to support the decision makers in these universities. Moreover, the decision makers should be aware of the quality of shared information which will provide high-quality information to them for better decision-making processes. Therefore, this research can play an important role to support the decentralization principle of public universities in Iraq. The findings of this quantitative study can be used to create high impact strategy to improve the electronic information sharing in higher education sector in Iraq.

1.11 Overview of the Study

The outlines of the remaining chapters are as follows:

- **Chapter two**:-

  Reviews the literature related to information sharing, electronic information sharing, operational database, data warehouse, data warehousing technologies and tools, DW implementation in government systems, DW implementation in the higher education sector, information systems for universities, DW implementation for electronic information sharing, and model of electronic information sharing. Chapter Two also presents the previous studies on the influence factors of electronic information sharing. The last in this chapter is the explanation of theories.

- **Chapter Three**:-

  Chapter three describes the theoretical research model of the study, explains the four characteristics of the theoretical model (electronic information sharing, technological, organizational and environmental), including the comparison of the electronic information sharing influence factors, the sixteen hypothesizes have examined and then, explain the dependent and independent variables.

- **Chapter Four**:-

  Chapter four describes the research methodology to be used in this study, research process, including research model, sample and population, questionnaire design, validity and reliability of the research, pilot study, data collection, and data analysis.

- **Chapter Five**:-

  Chapter five presents the analysis of the study including response rate, missing data, screening data, normality and, Kaiser-Mayer-Olkin and Bartlett's test, then demographic information has been analyzed, including state of electronic information sharing, test the validity and reliability which consists of factor analysis, average variance extracted, square root, and correlation tests, then multi-regression analysis.

- **Chapter Six**:-

  Chapter fix describes the discussion of each factor, the theoretical and practical contributions, then future work in this chapter, then conclusion.

1.12 Summary

This study proposes a model of electronic information sharing for Iraqi public universities, which is expected to highlight useful information of factors to increase electronic information sharing between these public universities and Ministry of Higher Education and Scientific Research. This chapter presents the overview of the study, mainly the research background of higher education sector in Iraq, electronic information sharing, data warehouse and decentralization principle, statement of the practical and theoretical problem, research questions, objectives, significance of the study, practical and theoretical contributions and scope of the study with the overview of the six chapters of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The previous chapter introduced the background, significance, and scope of this study. The chapter also described the underlying problem of electronic information sharing and the issue on electronic information sharing in the higher education sector of Iraq. Based on these issues, the research questions and the objectives of study have been established. Chapter two will continue with a review of the related studies on information sharing and electronic information sharing among public organizations, barriers of electronic information sharing, operational databases, data warehouses, data warehousing tools, higher education sector of Iraq, centralization and decentralization and electronic information sharing factors. Finally, this chapter discussed the Social Exchange, Critical Mass and Transactive Memory System Theories.

2.2 Information Sharing

Information is based on data. Thus, it is important for this study to first giving some highlights on data. Data can be identified in many ways for example: words, figures, voices and numbers which can be gathered by different pathways such as experiment, observation, and research; and eventually can be applied in order to make graphs, statistics, and reports (Kendal & Creen, 2006; Higgins, Taylor, Lisboa & Arshad, 2014). An example of data shared between public universities and MOHESR include

individual students such as name and result. Information is a process of data which is attained after data is processed and refined, transformed and shaped into a structured manner to make it helpful, significant, comprehensible and clear to any individual (Harry, 1994).

Traditional information sharing means to exchange the information between one person to another, in another word, exchange information between a sender and receiver. Thus, information sharing is based on the personal behavior and self-interest to share his or her information to others (Constant, Kiesler & Sproull, 1994; Razavi & Iverson, 2006). Jarvenpaa and Staples (2000, p. 130) state, "information sharing embeds the notion of 'willingness to share.' Volition distinguishes information sharing from involuntary information reporting. Information sharing is a voluntary act of making information available to others… sharer could pass information on, but doesn't have to". Examples of information shared between public universities and MOHESR are student's reports, employees' reports, policies, rules, suggestions scholarship documents.

Recently, information sharing has been hugely improvised by using information technology (Constant, Kiesler & Sproull, 1994; Williams, 1997; Volkoff, Chan, & Newson, 1999; Jarvenpaa & Staples, 2000). Thus, it has been used widely in the last few years in the public sector because of the Internet and smartphones (Cairns, Jackson, & Cooke, 2011). Information now is available for the user at anytime and anywhere (Cairns, Jackson, & Cooke, 2011). In the last fifteen years, public sectors have shifted from information protection principle into cross-organization information sharing. This shift happened based on three main keys: "events such as 9/11 that

underscored the failure of prior governmental information sharing practices; policy changes that emphasized cross-government coordination to improve efficiency and reduce waste, as evidenced in welfare reform and health care informatics; and changes in technology that allowed organizations to exchange information based on standard transmission and information exchange protocols" (Yang and Maxwell, 2011, p164). The next section will explain the electronic information sharing in public organization in details.

2.2.1 Benefits of Information Sharing

According to human actions a person is willing to share information with other people (Rioux, 2005). The sharing of information can be used as an approach to improve the relationship and social network between the senders and receivers (Marshall & Bly, 2004). Information sharing usually uses simple method of sharing such as face-to-face conversations (Rioux, 2005; Rioux, Hersberger, & Cruitt, 2005). Marshall and Bly (2004), found out the function and value of information sharing by discovering three reasons of why people share their information with others:

- To establish mutual awareness between information sender and information receiver.
- To educate or raise consciousness, and
- To develop rapport.

Dawes (1996) has identified the benefits of information sharing into three categories technical, organizational and political.

- **Technical Benefits**

Information sharing can avoid duplicates of information storing, information processing and information collection. Thus, avoiding the duplicate information can reduce paperwork, and it can reduce the costs of information processing. Moreover, by avoiding the duplication of information, it can improve the productivity and reduce the operations cost. Information sharing encourages the government organization to develop their technical resources. Finally, information sharing can provide the infrastructure of information to the government operations.

- **Organizational Benefits**

Comparing the information of organization with other external information can improve the validity and the accuracy of organization's information. Validity and accuracy information can make the problem solving easier with a better result because the information is considered as an important tool to solve the problems. Moreover, information sharing activities can improve the quality, quantity and availability of information in the organizations.

- **Political Benefits**

Information infrastructure of government organizations can provide better identifying and understanding of the broad economic and demographic trends because it leads to less isolated departments and better esteemed for the government aims. Information sharing supports the comprehensive among organizations, and that can improve the budgetary and legislative of the resource allocation decisions. Additionally, the quality and quantity of government information can be useful to the people who base on the information that government provides to make their decisions. Information sharing

between government organizations can discover the errors and gaps that may be no one recognize them before. Information sharing reduces the time of participation among organizations, and also it reduces the time that these organizations need to reprocess of information duplication.

2.2.2 Information Sharing Models

Information sharing arises from the complexity of solving problems on the delivery of services to public organizations (Bigdeli, Kamal, & de Cesare, 2011). Dawes (1996) proposed a theoretical model for interagency information sharing (Figure 2-1), based on a survey of New York public managers. The model demonstrates the learning of government agencies via information sharing. It includes factors such as benefits, risks, and barriers to information sharing. This theoretical model also explains that the sharing of experiences can be activated in order to find a solution for a particular information sharing problem. Information sharing is clearly demonstrated when the staff wants to share their experiences and opinions. This process of sharing is governed by the policy and management framework of a government environment. New ideas on policy and management can enhance the framework for the benefits and of risks in the future.

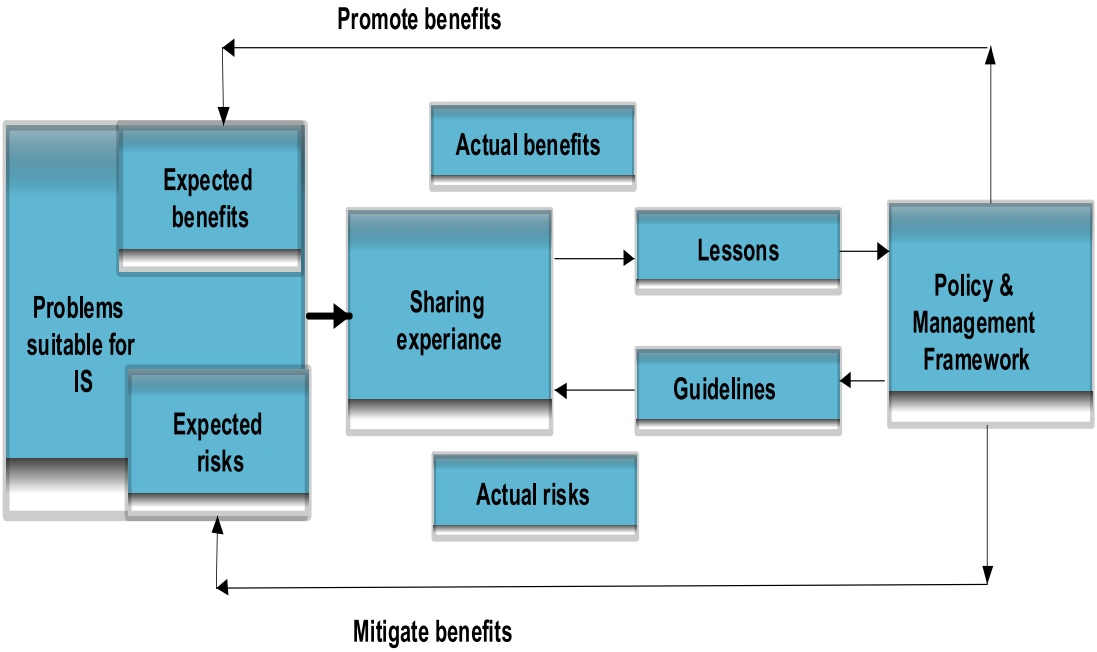

Figure 2.1. The first model of information sharing among the agencies (Dawes, 1996).

Figure 2-2 shows the theoretical model of Landsbergen and Wolken (2001) that is also based on Dawes' theoretical model and information system environment. This model compares three components that support IS infrastructure: technical, interoperability, and institutional policies. The technical element concerns the software and hardware compatibility within each agency. Interoperability policies pertain to metadata and interagency architecture. Institutional policies provide clear and best practices for information system support. This model uses five tools of information system:

1 Metadata to provide the nature, presence, and quality of information

2 Law and policy of sharing time and conditions among government agencies

3 Budgetary and economic implications of information system costs and benefits

4 Demonstration of successful information sharing

5 Management of support to control sharing and encouragements

Unfortunately, the work by Dawes failed to consider the technical factors related to more recently issues because her study was in the early of 1990s, but it published in 1996. Hence, Landsbergen and Wolken covered only the technical factors in their study. However, both studies did not consider the characteristics of information sharing in government agencies.

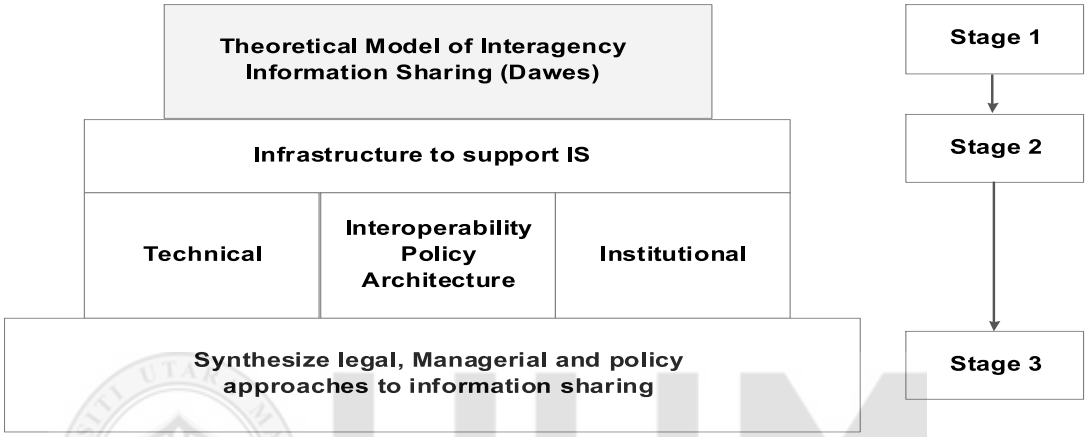

Figure 2.2. Expanded model of information sharing among the agencies (Landsbergen & Worken, 2001).

Public, private organizations and citizens are looking for methods in order to improve government operations and services (Dawes, 1996). In the 1990s public organizations have restructured physically and processes changed (Dawes, 1996). Thus, that leads later to shift from information protection into information sharing within the organization or with others (Yang & Maxwell, 2011).

Information sharing might be more complicated within an organizational context because the information is considered as a power. Thus, information can help the employee to protect one's place and enhance the individual status and identity (Constant, Kiesler, & Sproull, 1994). Information can be viewed as property, when staff shares it, that means he or she distributes his or her power and losing the position in the organization.

2.3 Electronic Information Sharing

The revolution of information system has transformed information sharing into electronic information sharing or the sharing of information electronically (Landsbergen & Wolken, 2001). Theoretical models proposed by Dawes (1996) and by Landsbergen & Wolken (2001) are considered as the first information sharing and electronic information sharing models, respectively (Estevez *et al.,* 2010).These models adopted information sharing of government agencies to make information sharing possible. With the advent of ICT and Internet, the form of information sharing had been electronically upgraded. Electronic information sharing means sharing the information electronically by using ICT such as, the Internet, email, phone, mobile, and websites (Akbulut *et al.,* 2009). The electronic mode of information sharing increases and doubled up the transfer of information amount which can help the decision makers to make better and faster decisions (Akbulut *et al.,* 2009; Bigdeli, Kamal & de Cesare, 2013b).

According to Gil-Garcia *et al.,* (2009), sharing information electronically between the public organizations is seen as a socio-technical phenomenon because inter-organizational sharing and integration information is a mixture of both technical elements and social elements. They found four related aspects starting from social to technical which can give a better understanding for electronic information sharing concept: trusted social network, shared knowledge and information, integrated data and interoperable technical infrastructure (Figure 2-3).

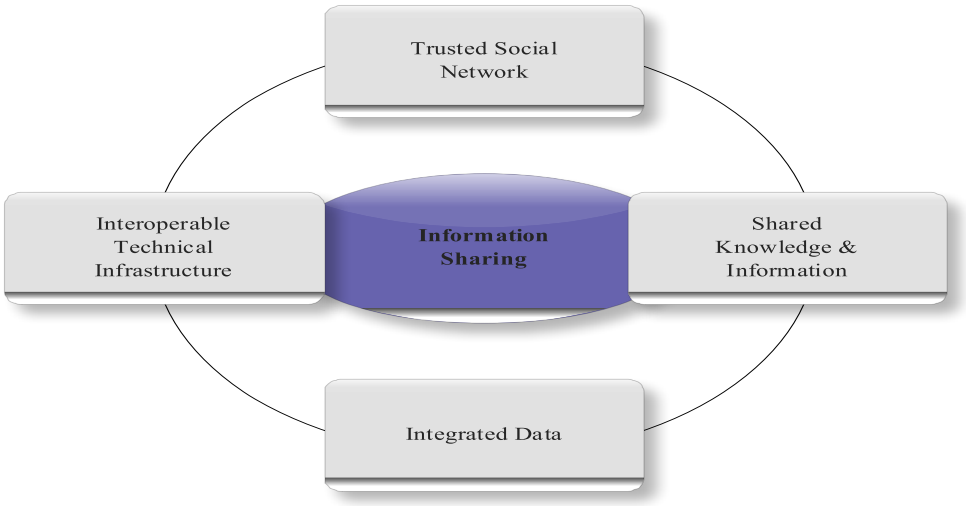

Figure 2.3. The concept of electronic information sharing between organizations (Gil-Garcia et al., 2009).

Trusted social network is considered the first stage of electronic information sharing in inter-organization. However, it refers to collaborations between employees who are involved in share the information electronically and are trusted each other. Shared information and knowledge refer to explicit and tacit knowledge in the form of general information, such as formal documents, email, messages and information relationships. Integrated data means to integrate data at different levels of organizations depended on standards of networking between them. Lastly, interoperable technical infrastructure refers to information systems that use to communicate and exchange information electronically between organizations (Gil-Garcia *et al.,* 2009). This study considers the four aspects in order to get a better understanding of electronic information sharing between Iraqi public universities and MOHESR. Thus, this study needs to know the collaboration and trust among staff. Moreover, it needs to measure information that shares between them with the percentages of sharing. Finally, data and information should be integrated, and infrastructure needs to be compatible between universities and Ministry.

2.3.1 Functions of Electronic Information Sharing

There are two types of functions of electronic information sharing (vertical functioning and horizontal functioning) that refers to interaction and collaboration between information system of organizations (Jing & Pengzhu, 2009). The horizontal functioning of electronic information sharing means sharing information electronically within the same level of organization. In another word, horizontal electronic information sharing refers to sharing information electronically with an organization that has the same criteria, goals, characteristics and so on, such as sharing information between local governments electronically. Figure 2-4 shows the horizontal functioning of electronic information sharing.

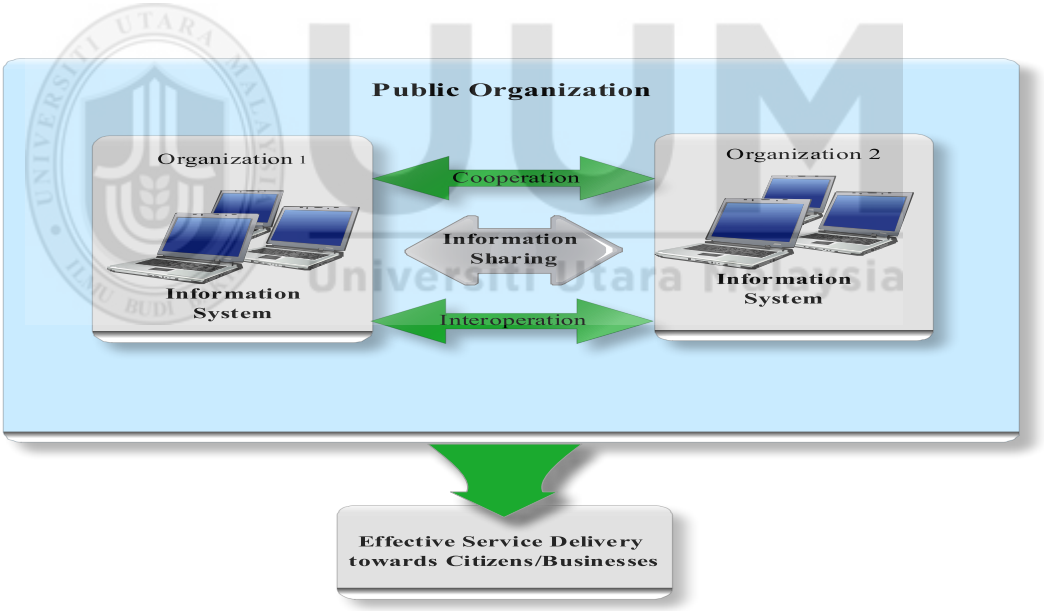

Figure 2.4. Horizontal electronic information sharing between organizations.

The vertical electronic information sharing refers to sharing information electronically with other organizations that has lower or higher criteria, goals characteristics and so on, such as electronic information sharing between central government and local government. Figure 2-5 shows the vertical information sharing.

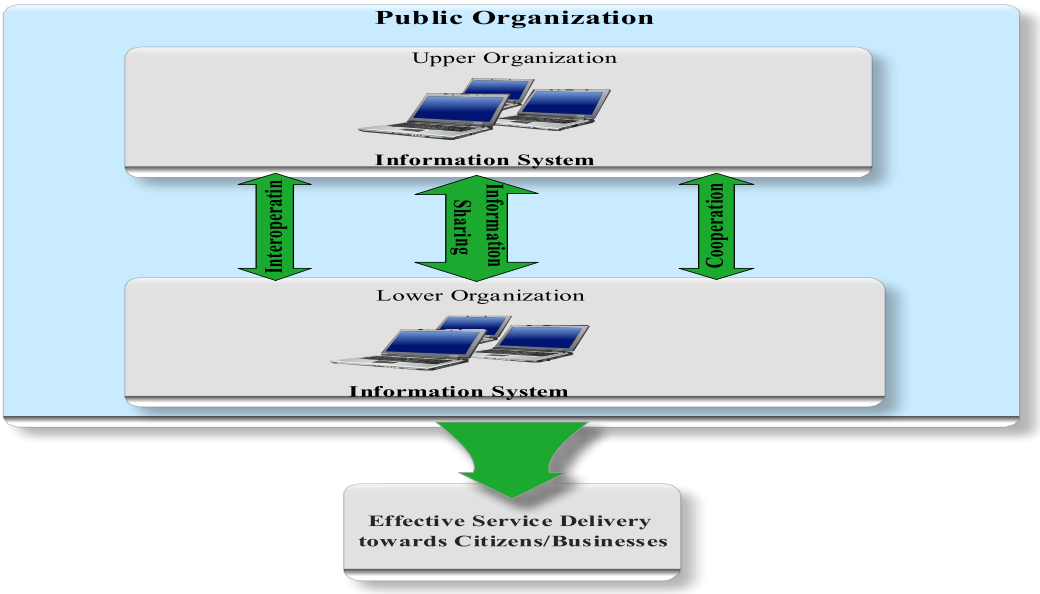

Figure 2.5. Vertical electronic information sharing between organizations.

This study focused on electronic information sharing between Iraqi public universities and Ministry of Higher Education and Scientific Research (MOHESR) which is considered as different level of organizations. Thus, this study is based on vertical functioning electronic information sharing rather than horizontal functioning electronic information sharing.

2.3.2 Electronic Information Sharing Barriers in Public Organizations

Electronic information sharing causes many challenges in a public organization. These challenges are the result of the electronic information sharing among different kinds of public organizations within different level and background such as central organization and its sub. Thus, there is a need for collaborations between public organizations to provide better public services to citizens (Bigdeli, 2012). The sharing can be done by crossing the barriers that public organization face. Pardo and Tayi (2007), pointed out four barriers of electronic information sharinginInter-

Organizational. Figure 2-6 shows the four barriers of information sharing and integration based on Pardo and Tayi (2007) research.

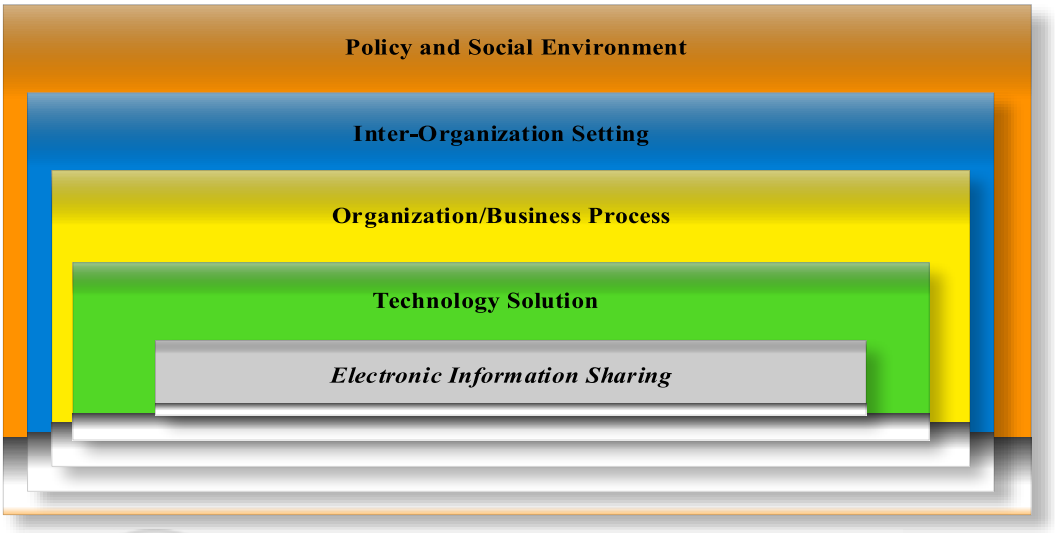

Figure 2.6. Four barriers of electronic information sharing (Pardo & Tayi, 2007).

- **Policy and Social Environment**

The first layer refers to standards, rules and policies of electronic information sharing among government organizations. This layer consists of many influential factors that have positive and negative effects on inter-organizational information sharing, such as policy concerns, legislation, economic and political situation (Pardo and Tayi, 2007). Legislation, policies, and politic factors are the most influential factors in electronic information sharing, so they need to be required. Electronic information sharing development and implementation are costly, with tangible resources (for example money, people, equipment, etc.) and intangible resources (data and information). Moreover, benefits of electronic information sharing project between government organizations are still not clear. Therefore, governments prefer to spend their budget on other information technology projects.

- **Inter-Organizational Setting**

The second layer refers to external challenges that affect information sharing in the organization. Inter-organizational relationships and network collaborations have a strong effect on information sharing (Pardo and Tayi, 2007). Goals of adopting electronic information sharing project are quite diverse between organizations (Navarrete, *et al.,* 2010). Thus, this difference of sharing goals and objectives between the government organizations can be identified as one challenge. Leadership can is an influencing factor of electronic information sharing (Gil-Garcia *et al.*, 2007; Zheng *et al.*, 2009). Leadership at all levels plays a significant role in order to define the rules and situation for the individuals involved. Trust among inter-organizational can be identified as strong influence factor of electronic information sharing (Pardo and Tayi, 2007; Gil-Garcia *et al.,* 2010). Thus, creating a good environment trust among organizations can be seen as an important step to establish successful electronic information sharing project. Furthermore, financial matters can influence electronic information sharing in the public organization. Because organizations need the financial capability to procure and develop hardware, software as well as improve the level of IT skill of employees (Kim and Bretschneider, 2004).

- **Organization/Business Processes**

The next layer refers to organization and business process factors that influence information sharing in the organization. In general, information systems have a strong influence on the *work process* of organizations as these systems embed the processes and information flow in complex software (Pardo and Tayi, 2007). Information sharing and integration involve mutually adjusting work processes of multiple organizations. It requires not only a technical transformation but also change in *decision-making*

policies and the mindset of the employees. Therefore, change in processes, functions and management mindset, especially in the public sector, represents a key issue (Lam, 2005). However the development and adjustment of separate processes, information flows and workflows is an extremely complicated task, resulting in a significant reduction in overall integration cost as the integration time and maintenance would be reduced.

- **Technology Solution**

In order to develop information sharing project, it is necessary to purchase and/or develop software, hardware, and telecommunication technologies. However, ICT infrastructure is considered as an important challenge of electronic information sharing (Jing & Pengzhu, 2007). Moreover, information sharing could be based on sharing and accessing information from multi data sources, such as documents, images, and text files. Therefore, this diversity of resources would cause many critical problems like different data format and information, and incompatible software and hardware. As a consequence, to solve these problems, organizations should develop data standards, construct ontology systems and interoperable design applications to provide a structure to across heterogeneous and unstructured resources (Wixom & Watson, 2001; Lam, 2005; Pardo and Tayi, 2007). One of the biggest challenges in information sharing is when different organizations in different locations shared huge amounts of data and information that have different format and store in different platforms. This situation caused many kinds of factors including *information quality*, *security*, *accuracy, consistency, and completeness.*

Pardo and Tayi (2007) identified the main challenges of electronic information sharing, which can be used to show the barriers of electronic information sharing in this study. This study also suggests using data warehouse as one of the technological factors in electronic information sharing.

2.3.3 Benefits of Electronic Information Sharing in Public Organizations

Researchers have found that information sharing among government agencies is very important, especially in the field of e-government systems (Pardo, Cresswell, Thompson & Zhang, 2006; Pardo & Tayi, 2007; Zheng, Yang, Pardo & Jiang, 2009b). According to Akbulut *et al.,* (2009), electronic information sharing among government agencies assists them to achieve organizational benefits, such as increased information accuracy, timeliness, resources and interaction organizations. Regarding technical benefits, electronic information sharing has able to decrease paperwork, enhance data management and improve decisions making, while from the political aspects, it can play an important role for cooperation (Bigdeli, Kamal and de Cesare, 2011). According to Estevez, Fillottrani, Janowski and Ojo (2011), electronic information sharing has different categories of benefits, such as technical, organizational, inter-organizational and environmental.

Technical – Electronic information sharing can improve the use of ICT as solutions for government organization exchange data issues.

Organizational – Electronic information sharing can increase the quality, quantity and availability of data and information.

Inter-Organizational – Electronic information sharing benefits increase by interacting with others because that can improve professional relationships or enhance collaborative networks.

Environmental – Electronic information sharing helps public administrations in delivering better services, such as better understanding of economic and demographic trends.

According to Mendes Calo, Cenci, Fillottrani and Estevez (2012, 2014), benefits of electronic information sharing are classified into three types, such as beneficiary (citizenship and government), target (product and process) and impact (primary and secondary). Thus, based on these types the researchers proposed five views of classification into benefits of electronic information sharing. The first is called nature view which based on the technical, organizational and political benefits same as Dawes (1996). The second view refers to primary and secondary impacts of electronic information sharing benefits (primarily comes from the implementation and secondary is achieved form the primary). The third is a beneficiary view that refers to internal beneficiaries (inside government organization like staff) and external beneficiaries (outside government organization like citizen and business). The fourth is target view, which based on the product and process benefits. Fifth is a horizontal view which refers to benefits of the whole system, such as efficiency, effectiveness, and response. Figure 2-7 shows all of the five views. Public universities can gain all of these benefits if they manage to build a successful electronic information sharing project.

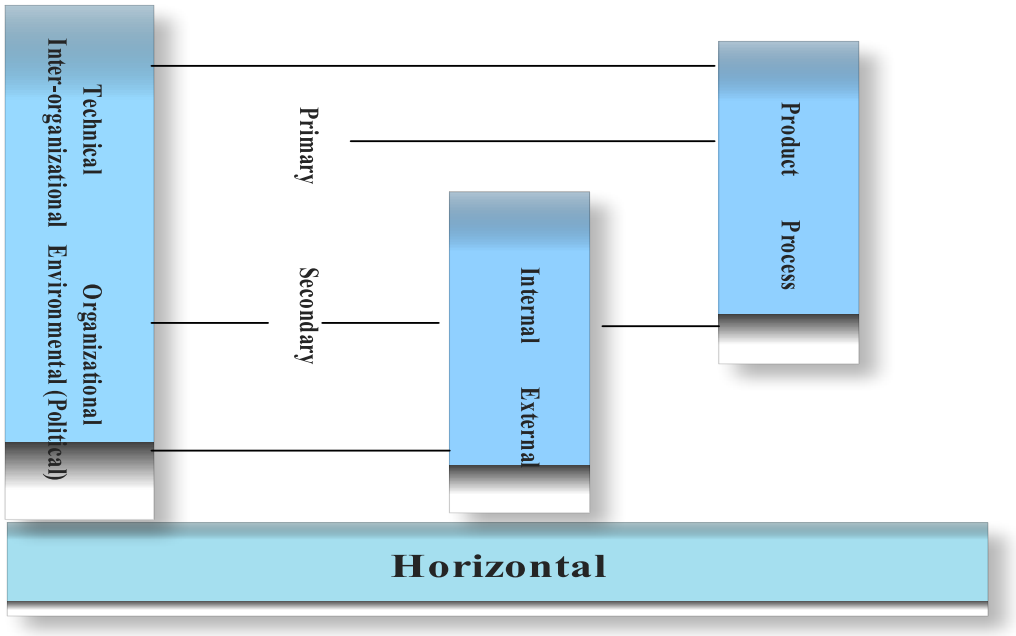

Figure 2-7 Benefits of electronic information sharing (Mendes Calo et al., 2012)

Thus, according to the above four categories, electronic information sharing between public universities and MOHESR can provide several benefits. First, sharing information electronically can improve the use of ICT as solutions for information sharing problems between public universities and MOHESR. Second, electronic information sharing can increase the accessibility and availability of data and information for each university with high quality. Third, benefits of electronic information sharing can also be achieved by interaction with MOHESR because it enhances the relationships and improves collaboration between the universities and MOHESR. Finally, it can help public universities to deliver better services, such as to having a better understanding of Ministry rules and supporting decision makers at the proper time.

2.4 Higher Education in Iraq

To democratize the Iraqi political system and to modernize Iraqi society, the focus must be given to the higher education sector (Herb, 2009). Iraqi universities have the ability to assist in solving the nation's social and political disagreements. Universities give students and faculty members the chance to become agents of social change. Hence, the higher education sector plays a major role in the protection and prolongation of civic peace in Iraq despite its history of war, authoritarian rule, inadequate resources, and rigorous social and political instability (MOHESR, 2004).

2.4.1 History of Iraqi Higher Education

Iraq has always placed great value on education (Issa & Jamil, 2010). A century ago in 1908, an academy of law was first recognized in Baghdad, thus marking the emergence of Iraq's modern higher education sector. Between the 1920s and the 1950s, many schools and institutes were established all over the city. In 1960, all universities were chartered and pooled together to become the University of Baghdad. In the 1960s and the early 1970s, the higher education sector prospered along with the progress of the arts and sciences (Issa & Jamil, 2010). The Iraqi Academy of Sciences became a center for research in language, history, and literature. The medicine and science faculties of the University of Baghdad impressed many students from the Middle East. However, political changes destabilized the emerging enthusiasm for Iraqi higher education. The higher education sector became a spot for political correctness, cronyism, corruption, and resource manipulation to advance the regime's ideology and policies. This condition was supported by the fact that the Baathists progressively directed public life after 1968, especially after 1979. In 1970, the higher education sector was centralized under the direction of the MOHESR and feigned an appearance

of academic independence during this process (Harb, 2009). In 1991, the situation became delicate as a result of the permits issued by the UN after the first Gulf War (Harb, 2009).

Twenty universities and forty-seven technical institutes were under the general management of the MOHESR on the eve of the 2003 attack. In 2004, Iraqi universities consisted of 200 colleges with approximately 800 departments and 28 specialized institutes or research centers (UNESCO, 2004). In 2003, the list of Iraqi public universities included Dahuk, Irbil, Sulaimaniyya, Koya, Mosul, Kirkuk, Tikrit, Diyala, Anbar, Baghdad, al-Mustansiriyya, Islamic Studies, Al-Nahrain, Technology, Qadisiyya, Kufa, Karbala, ThiQar, Babil, Wasit, and Basra (Hogskoleverket, 2003). The number of universities has increased since 2003; 22 public universities are currently under the control of the Ministry of Higher Education and Scientific Research (MOHESR); 32 private universities are under the semi-control of the MOHESR (MOHESR, 2013).

2.4.2 Organizational Structure of Iraqi Higher Education

According to Lafta (2010), the higher education sector needs to change the structure of public and institutional mechanisms and operations as well as the philosophy of managing in its institutions. Thus, government, the private sector, society and academic community are in front of a huge responsibility to change the structural reform, work destruction and urgent institutional system of higher education. According to Al-Qaisi (2008), MOHESR should restructure its system in order to solve the challenges that Iraqi public universities faced. Juan and Abdalabas (2011) highlighted that one of the things that MOHESR should do is to decentralize its

organizational structure. National Strategy for Higher Education Development for the years 2009-2013 has recognized the organizational structure issues in the Ministry and its institutions (NSHED, 2009). However, for more than forty years from the date of the higher education system in Iraq, many attempts have been made informally to consider the practical and methodical in their development, but all of these trying are failed (Lafta, 2011). According to Harb (2008), the reason for these failures is bureaucracy, over-centralization of decision making, and neglection by political leaders, low quality of administration and academic staff, and personal inability in affecting changes. Moreover, according to Elameer and Idrus (2011a), Iraqi organizations such as (higher education sectors) followed the very old standards and laws that make them having improper regulations and plans. For example, all Iraqi public universities have almost the same managerial structures by following the structure of MOHESR (APPENDIX B; APPENDIX C). Thus, there is no difference between the organizational structure in these universities (Alhadithi, Idrus & Elameer, 2011). This situation happened because of the strict centralization that MOHESR followed.

2.5 Centralization and Decentralization in Iraqi Higher Education

Centralization means that the authority and financial resources of ministries and agencies are pooled in the country's capital (Abdurrahman, 2007). In centralization, the central government disseminates guidelines and instructions to the local government, which in turn must perform the directives without recourse (Sujarwoto & Nugroho, 2011). The guidelines of the central government are identified according to the criticism retrieved from government branches (Shama, 2007). From the 1920s up until a few years ago, the Iraqi government strictly centralized all ministries and

sectors. Hence, all universities in Iraq are governed by the Ministry of Higher Education and Scientific Research (Hafadh & Husain, 2010). Thus, this over centralization from MOHESR has caused numerous problems, which follows:

1. Education has an extremely centralized administrative structure that restricts originality and elasticity (Yousif, 2012).
2. A mechanism for curricula quality assurance is lacking (IIE, 2012; UN, 2012).
3. University decision makers have limited authority over their respective universities. For instance, the university president and the dean are not always authorized to make decisions (De Santistbanand, 2005).
4. The perplexity of the regulatory framework of the Iraqi government and its management techniques directly affect the framework of the Ministry of Higher Education as well as of the other ministries and corporations (De Santistbanand, 2005).
5. Administrative and technical staffs are scarce (Kaghed & Dezaye, 2009).
6. Resources are insufficient because the Ministry of Higher Education controls resource distribution (Harb, 2009).
7. Authority over the university and financial independence are lacking (Kaghed & Dezaye, 2009).
8. Student applications are centralized.
9. Centralized state control means that the state has a monopoly over educational content. This condition is best demonstrated in the implementation of ministerial exams. Another example of state control is the closing down of schools for minority groups and the introduction of the subject “National Culture” at all levels of the education system (Hogskoleverket, 2003).

10. Since their creation in the early 1920s, Iraqi academic foundations have been controlled by decisively centralized dimensions. The central government determines the number of students enrollees for each institution (Al-Maliky, 2012).

Oppositely, decentralization refers to decentralizing the decision making from the central government into the local government. Decentralization helps to make more profits. Moreover, it increases the capacity and revenue of an urban area. Decentralization of government can permit the local governments to supervise their services, produces, decision-making, facilitates efficient service delivery, and provides quality services (Shah, 2011). Recently, the public universities in Asia are following decentralization, deregulation, privatization, marketization and administrative reforms in higher education (Mok, 2003, 2005). For instance, in South Korea, China and Taiwan, they followed decentralization principle processes in their higher education systems to make their universities more creative, innovative and responsive to external and internal changes (Mok, 2007; Chang, Wu, Ching, Tang & Xiao, 2011). Thailand and Pakistan still face several problems because strict centralization of authority and bureaucratic rigidity that they use in their higher education sector (Kirtikara, 2012; Nayyar & Naqvi, 2013). Adopting strategies of decentralization in higher education sector means shifting from traditional "state control model" into "state supervision model". Nonetheless, the decentralization does not mean weaken the role of the Ministry of Higher education because it will play strong roles, such as monitoring, making rules and policies, providing financial support as well as developing strategies and plans (Mok, 2008; Ikoya, 2008). According to Mok (2008), the benefits of practicing decentralization principle in higher education sector are as follow:

- Free from the operational regulations and constraints imposed on statutory boards.
- Gives more autonomy administratively and financially.
- Decentralization also provides more accountability to different stakeholders in the local community.
- Increases the responsibility for the key decisions affecting university directions and strategic developments.
- Provides rigorous internal quality assurance systems.
- Gives high flexibility in student admissions and tuition fees policies.
- Improves the power to be decentralized to deans, department heads, and faculty members.
- Enhance performance-driven assessments are developed which will inform government's funding decisions.
- Become resourceful since the government will continue investing in public universities (Mok, 2008).

A well-organized education administration is a vital goal, particularly because the Iraqi government has started to decentralize its agencies (UNESCO, 2011). Figure 2-8 shows the suggested plan for decentralizing the structure of the Iraqi administration. The central government sends instructions, policies, standards, and coordination measures to the sub-governments. The instructions are then passed on from the central government to the provinces and from the provinces to the governorates and eventually to local township and city administrations. The sub-governments gather information, supply suggestions, and explain objections. The information, suggestion, and objections are transferred from the local administrations to the governorates, to the

provinces, and finally to the central government. Therefore, for example, Ministry of Higher Education can transfer their instructions, policies, standards, and coordination measures to its public universities and these universities can send their information, suggestion, and objections to the MOHESR.

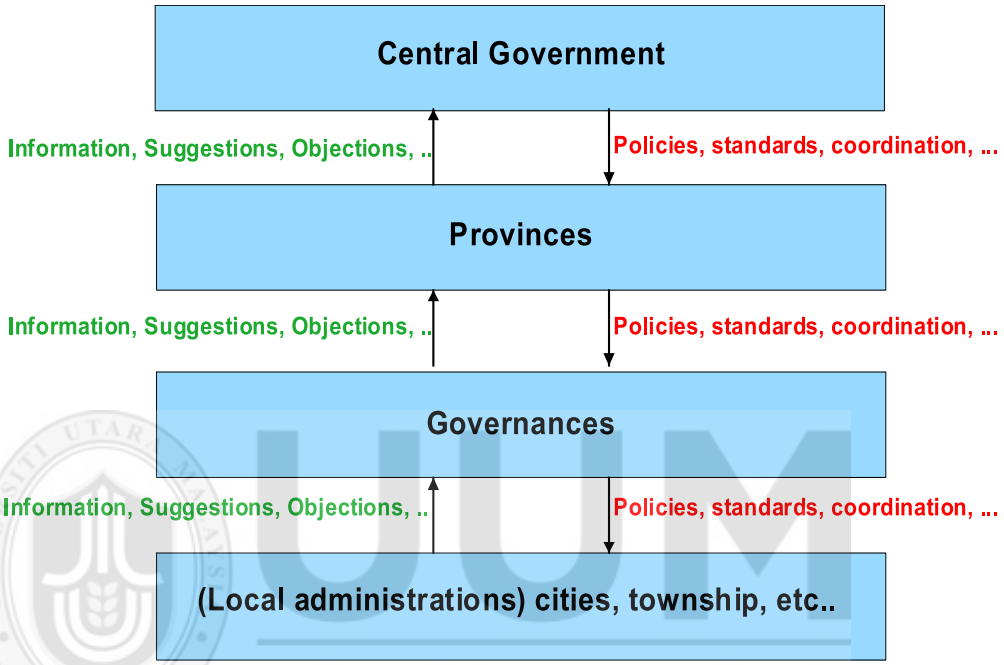

Figure 2.8. Suggestion for Iraqi Decentralization administrative structure (Al-Zobaidy, 2007).

In 2011, Wafa'a Fadhil, the director the Local Iraqi Government Association, mentioned that the Iraqi government aims to decentralize its established systems of its ministries. Within this decentralization process, independence and authority can allow the local governments to make their own decisions. The Ministry of Higher Education and Scientific Research is one of the ministries involved. However, the universities in Iraq are still dealing with several issues that hinder them from establishing decentralized systems; this problem arises because of the university decision-makers' lack of experiences and resources (MOHESR, 2012).

The resources include data, information, knowledge, and experiences. Motivated by this phenomenon, this study, therefore, was conducted with an aim to propose an information sharing model with an expected contribution to improving electronic information sharing between Iraqi public universities and MOHESR. This improvement is expected to result in the increase of information in each university. With a large volume of information, reliable and fast access and sharing, university decision makers can have more capacity to make their decisions. This study intended to support the decentralization of Iraqi public universities indirectly.

2.6 Information System in Iraqi Higher Education

Information systems have been used in an organization or between organizations to help it or them to adapt swift changes in order to achieve the needs of their customers (Lv, 2010). Universities adopt information systems to provide services to its staff (Dai & Kumar, 2010). According to Dai and Kumar (2010), information system supplies the universities' staff with information by providing access to the database. Information system also can make the management work easier and decrease the process time. Figure 2-9 shows the information system in a university whereby it can use its information systems to connect with government, universities, companies, students, staff and other related entities.

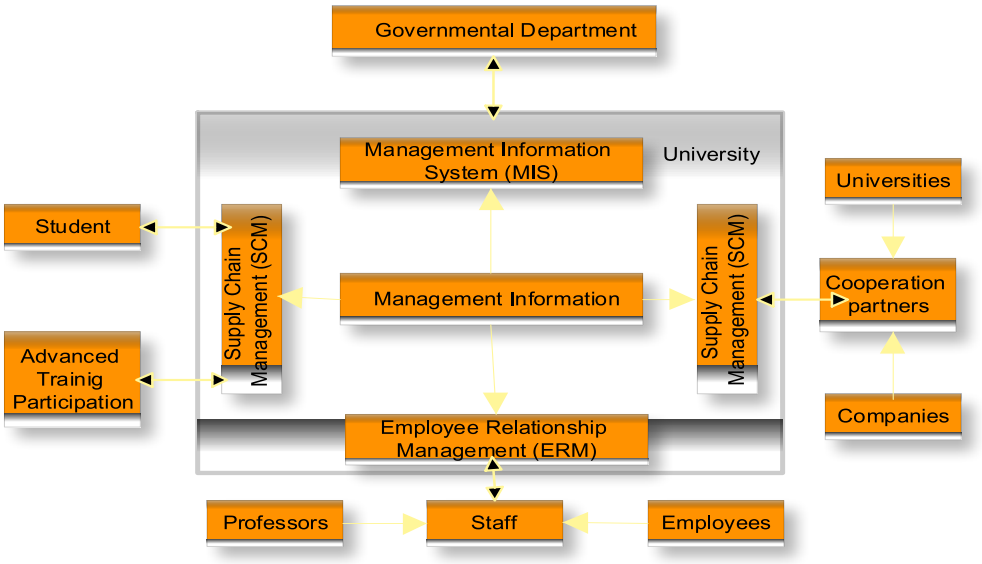

Figure 2.9. University's information system (Kudrass, 2006).

Multi-information systems have created a lot of difficult issues in the management of universities (all management departments in universities worked independent focusing on their needs, and there is no unified planning) (Liang & Lan, 2010). Moreover, university information systems have more kind of problems for example; different departments have different levels of information technology, information isolated among the universities and finally, lack of information system that can support the decision makers (Kudrass, 2006; Liang & Lan, 2010; Liu, Li & Lu, 2011). Universities have used the Internet to integrate their information systems because it can help them to share their information (Sohn, Yoo, & Lee, 2007; Zhou, Wang, Han & Zhang, 2010). To increase the electronic information sharing among multi-information systems, it needs for compatibility; the software, hardware and staff's IT skills (Landsbergs & Wolken, 2001; Yang & Maxwell, 2011). Compatibility issues of information systems have appeared because of the multi databases (Kudrass, 2006; Wai & Aung, 2009; Yang & Maxwell, 2011). According to Dimokas, Mittas,

Nanopoulos and Angelis (2008), many universities used data warehouse to solve integration issues.

The public universities in Iraq are looking forward to using full information system in their environment because that helps them to enhance their education, make their decisions, solve their problems and give more value for their activities (Al-Askari, 2009; Nori, 2013). The Iraqi public universities use ICT to provide better e-services for its staff and student, such as information management system, e-learning and e-government website (Al-Askari, 2009; Mohammed, 2010; Juwas, 2011; Nori, 2013; Hussian & Juwad, 2013). Figure 2-10 shows the suggested information management system for the staff in University of Karbala, which can use to show the profile for staff (Hussian & Juwad, 2013).

Figure 2.10. Information management system in University of Karbala (Hussian &Juwad, 2013).

2.7 Electronic Information Sharing in Iraqi Higher Education

Electronic information sharing involves complex interactions among the parties of government agencies (Zhang & Dawes, 2006; Gil-Garcia, Chengalur-Smith & Duchessi, 2007a; Gil-Garcia, Chun & Janssen, 2009). This complexity arises from the fact that parties are not always open to sharing their personal information and knowledge with others. Iraqi public universities use ICT, such as the internet to get the information and knowledge for purpose scientific research, and also it uses to sharing information by universities staffs (Mehdi & Ahmed, 2011). The limitation of electronic information sharing between organizations is considered as a big gap in Iraqi government system (Mahmoud, 2010; Husain, 2013; Ali, 2013). This problem currently exists among Iraqi agencies and has been recognized by public universities in Iraq (UNESCO, 2011; Al-Aqaby, 2012).

Figure 2-11 shows the percentage of electronic information sharing in four public sectors in Iraq namely; education, higher education, health, and water. Electronic information sharing in Iraqi higher education sector is the second lowest; which is 53%. According to Bigdeli *et al.,* (2013b), electronic information sharing project can improve the decision-making process. An increase in electronic information sharing provides many benefits such as decrease the time, effort and costs of decisions making that needed to solve problems in higher education sector. Driven from this background, this study took some effort in investigating factors to increase the electronic information sharing between public universities and MOHESR in order to improve electronic information sharing thus enhancing the quality of decision-making process.

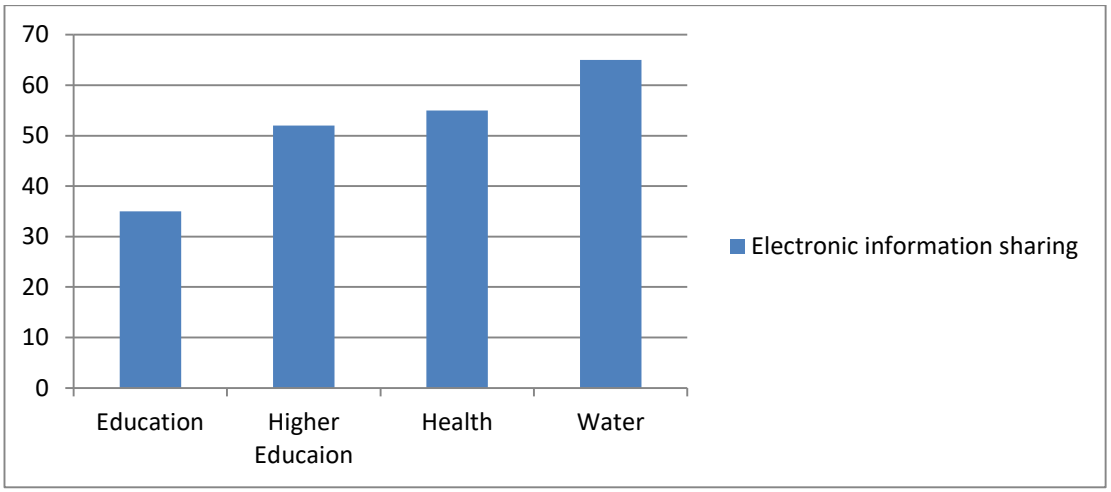

Figure 2.11. Percentage of electronic information sharing in four Iraq public sectors (Al-Aqaby, 2012).

The previous studies had listed some electronic information sharing barriers that positively or negatively have influenced in public sectors in Iraq. These include politics for instance law, decision making, and bureaucracy (Abed, 2007; Abdul-Alrahman, 2011), organization and management barriers such as costs, lack of management devices, and incompatibility in IT (Abed, 2007; Abdul-Alrahman, 2011; Fadhelalla, 2012), human resources barriers for example lack of IT professionals, resistance to change and incompatibility of staff (Abed, 2007; Abdul-Alrahman, 2011; Fadhelalla, 2012), technical and technology barriers including lack of expertise, lack of services, and difficulty in choosing the devices (Alwan & Abdurrahman, 2010; Abdul-Alrahman, 2011), environment aspects for instance information security, individual privacy, and IT infrastructure (Alwan & Abdurrahman, 2010; Abdul-Alrahman, 2011; Fadhelalla, 2012; Ahmed, Jasem, & Hassan, 2012), and policy aspects such as laws and legal framework, behavior, and risks (Abed, 2007; Alwan & Abdurrahman, 2010; Abdul-Alrahman, 2011; Fadhelalla, 2012; Husain, 2013; Ali, 2013). In the domain of public universities in Iraq, multi-databases were used for

information storage (Ahmed, Jasem, and Hassan, 2012), which was viewed later as a technological barrier to support electronic information sharing (Bellamy and Raab, 2005; Nash, 2008).

2.8 Operational Database

The operational database (DB) or traditional DB is a storage of the collection of background and event data from one or more organizations. According to Rob, Coronel, and Crockett (2008), operational DBs do not support multidimensional views, which are characterized by advanced data modeling functions, advanced data presentation functions, advanced computational functions, advanced data aggregation, and consolidation and classification functions (Rifaieh & Benharkat, 2002; Shahzad, 2009). Multidimensional views are too important to be used in a decision support system (DSS) (Rifaieh & Benharkat, 2002; Shahzad, 2009). Furthermore, resources are wasted because DBs are independently established for each organization, thus causing several issues in data management (Xu, Lu and Zhao, 2011). For example, each college in any university employs a different information system. The information system stores data in separate DBs; this form of storage leads to data management issues such as data inconsistency and data redundancy(Xu, Lu and Zhao, 2011).The traditional DB remains the main source from which the data warehouse collects data (Shahzad, 2009; Velicanu& Matei, 2007). Figure 2-12 show how a user accesses data and sends queries from multiple information system applications via multiple DBs of one university.

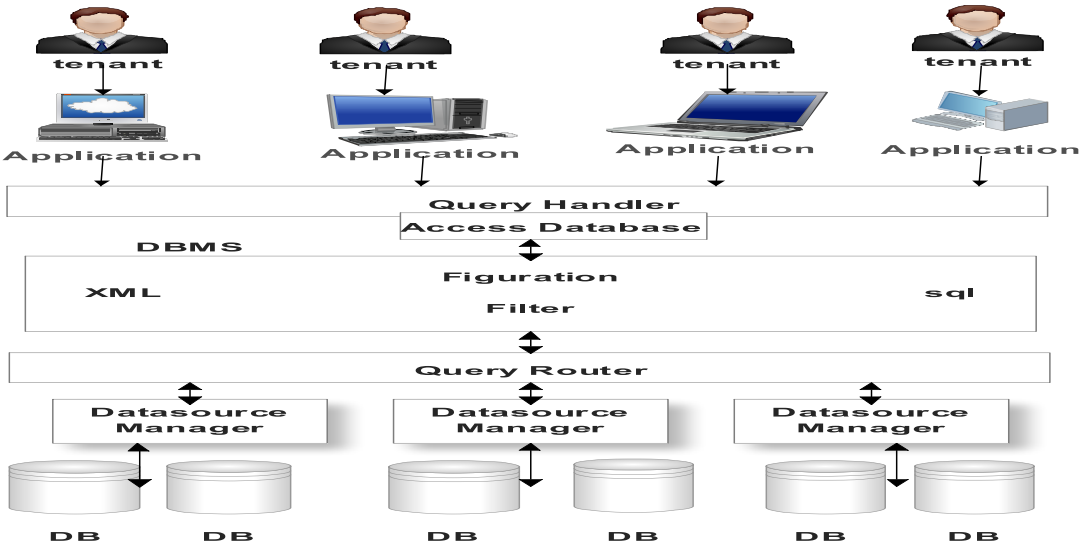

Figure 2.12. Multi-databases in one university (Xu, Lu and Zhao, 2011).

Currently, each higher education sector uses operational DBs to store data and thus saves data and information separately. However, information stored in separated DBs in one place may not be available to another place. This problem is central to the present research. In addition, multiple DBs with different platforms are not designed to support the systems of a university, including its data management systems, data mining (DM) systems, analysis systems, and DSS. The use of separated databases creates the need to share information electronically in higher education sector. Thus, this study investigated the use of common storage (e.g.,. data warehouse) as a factor in order to increase the information sharing electronically in higher education sector.

2.9 Data Warehouse

According to Inmon (2005), data warehouse is referred as "subject-oriented, integrated, time-varying, non-volatile data collection, which is used primarily in organizational decision-making process". Based on this definition, data warehouse cannot change or update its data at any given period (Martyn, 2004). Data warehouse extracts clean data from multi-heterogeneous databases by using ETL tool through

transform and load these data in the common warehouse then data should be modeled and structured in the data warehouse. Finally, data warehouses use business intelligence tools to analyze, mine, and construct multidimensional data views that aid in decision making (Inmon, 2005). Four characteristics of data warehouse are subject-oriented, integrated, time-variant, and non-volatile.

2.9.1 Data Warehouse Tools and Techniques

Data warehouses feature huge storage capacities that allow data collection without deletion or update options. Data warehouses also employ various tools and techniques. These tools can be used to clarify, structure, integrate, model, mine, and multi-dimensional data. Upon the application of these tools, the data are ready to be used in DSS. Several tools and techniques are described below.

Extract, Transform, and Load (ETL) is used to extract and transforms clean data and information from multiple DBs. The suitable data are finally loaded into a corresponding space in the data warehouse (Wu, Miller & Nilakanta, 2001; Liu & Luo, 2010). Database Management System (DBMS) systematically stores data inside warehouses following structures such as the star schema structure model and the snowflake schema structure (Inmon, 2002; Tao, Zhu, Zuzarte, & Lau, 2003; Gorawski, 2009; Shahzad, 2009). Metadata is used to structure information within data warehouse (Rifaieh & Benharkat, 2002; Margaritopoulos, T.,Margaritopoulos, Mavridis & Manitsaris, 2008). The data mart is a small repository of data and information that is built to store retrieved data according to their respective departments (Sankaran, Suresh, Gupta, Nesamoney & Mukhopadhyay, 1998; Kimball and Ross, 2002; Paulraj and Sivaprakasam, 2012). OLAP (Online Analytical Process) is used to analyze data and information with multidimensional views of a cube. Thus,

an OLAP cube provides a three-dimensional description of information (Christanto, Utomo and Sediyono, 2012). The DM tool is used to extract new knowledge from quantities of data (Sair, Erraha, Elkyal and Loudcher, 2012). OLAM is a new tool that combines DM and OLAP to obtain information suitable for a DSS (Han, 1997). Decision Support System (DSS) aids reports for decision-maker in an organization (Liu and Luo, 2010). Ad-hoc query allows the data warehouse user to create his/her queries (Marketos and Theodoridis, 2010). These tools can be used to support data warehouse in order to share the information. Figure 2-13 illustrates the data warehouse and the use of tools and techniques in its platform.

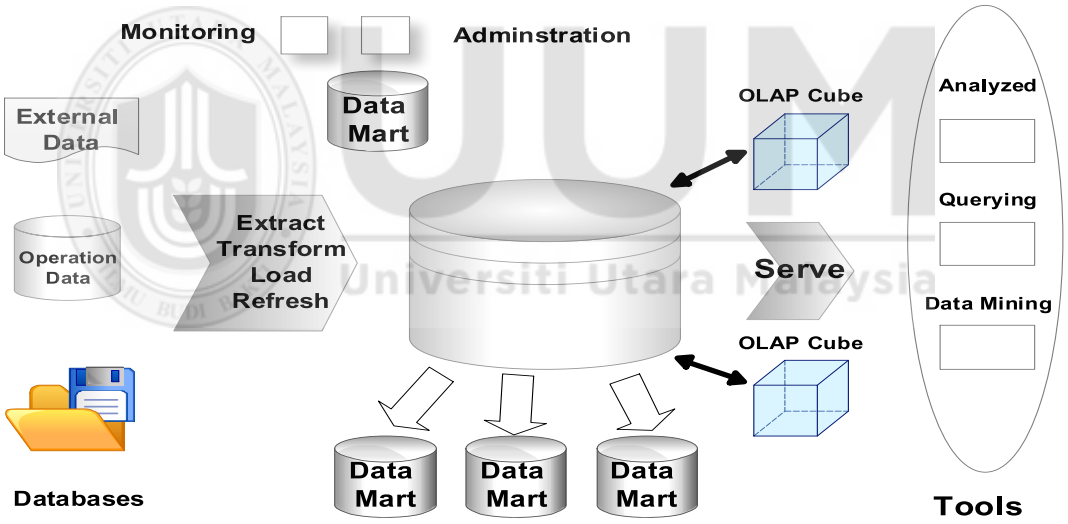

Figure 2.13. General architecture of the common data warehouse (Turban, Aronson, Liang & Sharda, 2007).

2.9.2 Data Warehousing for Higher Education Sector

The stakeholders of higher educational institutions, such as the employees, funding bodies, parents, students, and the government, are concerned about the level of educational excellence provided in higher educational institutions. They are also focusing on modifiable authorities that can direct the quality and principles of the

higher education system (Bhanti *et al.,* 2011). Stakeholders find solutions to these issues from different resources. Public administration officials must, therefore, recognize the advantages of data warehousing in recent times (AlMabhouh & Salehl 2008; Bhanti *et al.,* 2011). Data warehouse technologies allow interactive data analysis and ad-hoc reporting; thus, the technologies can supply mainly the categorical structure of static data and variable data (Inmon, 1996). It automatically converts static data into influential data if variable data are incorporated into static data. Eventually, the automatic amendment of relevant DBs is allowed because of their data structure. Therefore, the structure of DBs must employ multidimensional processes to comply not only with the needs of departments but also with those of the citizens who are the end users of this sector (Grotevant & Foth, 1999). Moreover, there is a need for real-time transactions in higher education such as paying bills, enroll students in curses, make aggregate information that collected by higher education systems in order to make it available for institutional management, analyzing and planning (Yanosky, 2009). According to Song, Bao and Shi (2010), data warehouse can use real-time system in its ETL to integrate the data and information in time.

For example, every university in India usually operates separately and competes with other universities for students (Bhanti *et al.,* 2011). In this situation, the diversity amid periods of fund requests and expenditures is left to forecasting and guess work. The process can be made automated or time bound by the support of e-government applications. Data warehouses can carry all the details required to distribute the funds among universities because they are built to supply a reasonable share of available funds (Bhanti *et al.,* 2011). Moreover, a university data warehouse can be used in the selection of potential scholars through student DBs (Bansal & Sood, 2011). The

governing bodies can offer a common platform for the best performing students and the industries seeking employees for jobs, projects, research work, and so on. The governing bodies/industries can easily obtain the details of top students in different fields all over India with the aid of data warehouses (Syväjärvi, Stenvall, Laitinen & Harisalo, 2009).University data warehouses can integrate and analyze university data to aid in decision-making processes.

2.9.3 Data Warehouse for University

University departments sometimes lack of resources in one sector and have more than enough resources in another sector. This condition arises because of the absence of correct data and services to propagate information. The existing information in one department may not be accessible to other departments. This problem emerged because the information was saved in various DB systems (Bansal & Sood, 2011; Bhanti *et al.,* 2011). To address this issue, there is a need that the departments of the higher education sectors and universities should store their data in common storage platforms such as in data warehouse environment (Türkmen, 2007). The ease of use, transparency, effectiveness and the impact of government services system in a university are automatically assessed because data warehouses can generate a large amount of university data.

Figure 2-14 is a general diagram that shows the use of a data warehouse of a university. The university's data are extracted from DBs, then are stored and sorted inside the data warehouse using a server. On the one hand, reports and DSS are used to help administrators make decisions. On the other hand, the university staff can use the data warehouse interface via the Internet to access university data and information. In this

case, data warehouses can support university decision makers through the creation of daily reports.

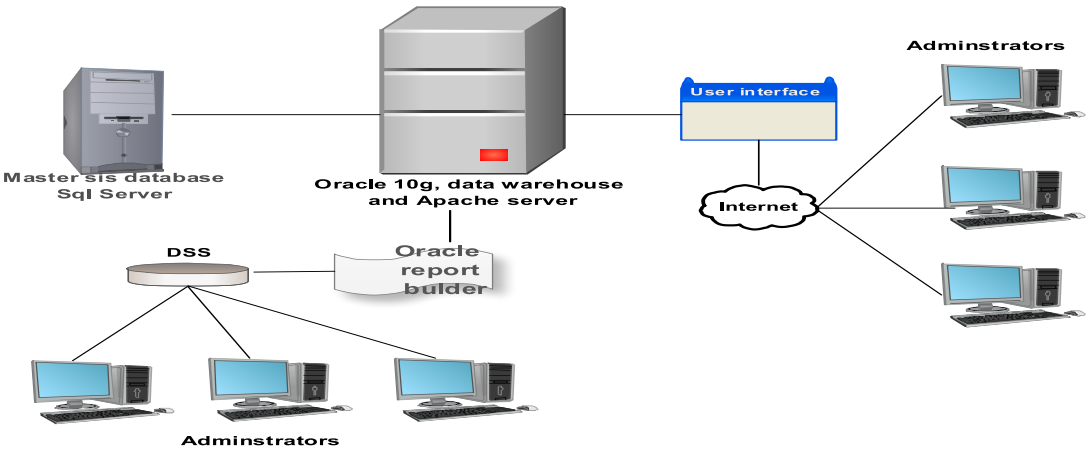

Figure 2.14. Common storage of data warehouse in University (Turkmen, 2007).

The data warehouse platform can be used as the common storage of data and information for all public universities in Iraq. Authorized users can access these data and information anywhere and at any time. Data warehouses can store clean and quality data from multiple university DBs and then save the data in a proper structure inside the warehouse. The data warehouse tool can be used to mine and analyze data. This feature supports university decision makers through the provision of reports from the DSS. The data mart in the data warehouse can store data and information of Iraqi public universities. The data are stored according to the department, thus allowing the easy and quick retrieval of departmental data.

2.9.4 Data Warehouse for Ministry of Higher Education

The Malaysian Ministry of Higher Education (MOHE) has exerted effort in using IT to manipulate information in all operations, including in decision-making (AlMabhouh & Saleh, 2008). For instance, 20 public universities under the MOHE have operation management systems that are used to manage staff, students, finances, and research.

Presently, the MOHE needed an integrated management system that can use the existing data and information of Malaysian public universities to meet business requirements. A study of AlMabhouh & Saleh, (2008) proposed the use of advanced methods such as data warehousing to MOHE to develop the decision-making processes within universities. Building a complete data warehouse for the MOHE can help the top management in making correct decisions and plans, which can in turn aid in the expansion of systems, rules, and courses that are employed in the universities to sustain global development in the areas of higher education (AlMabhouh & Saleh, 2008).

Figure 2-15 demonstrates the simplest structural design of a data warehouse for the MOHE and its correlation to the source data in the transactional system of universities. The right side consists of the data warehouse system, and the left side comprises the operational DBs of the universities. A staging area (staging DB) is located between the operational DB and the multidimensional DB (MDDB); this area encloses a relational DB for all the 20 universities.

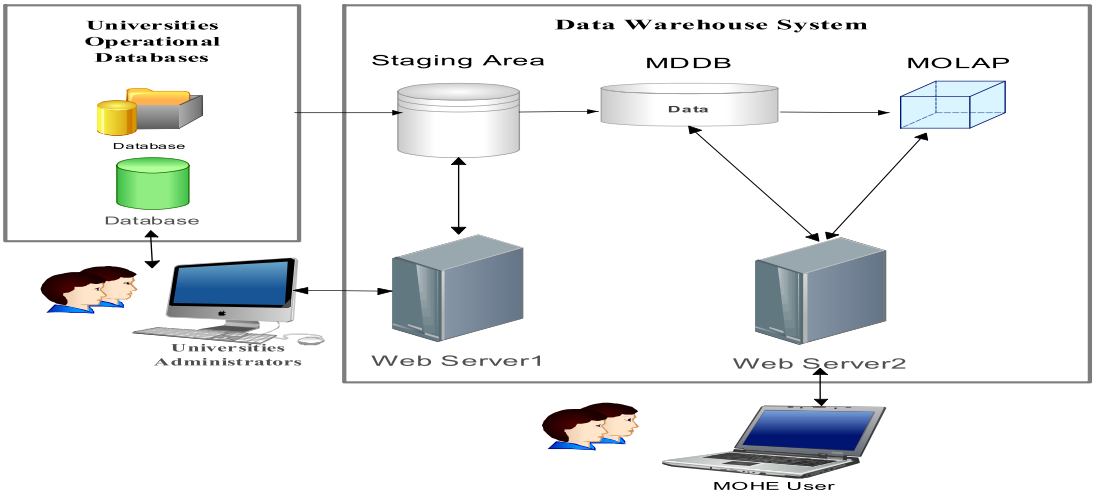

Figure 2.15. A data warehouse platform for MOHE and Malaysian public universities (AlMabhouh & Saleh, 2008).

Many other studies have delved on the use of data warehouses for a university system (Dongsheng & Wenjing, 2009; AlMabouh & Saleh, 2010; Bhanti, Kaushal & Pandey, 2011; Suresh & Mahale, 2011; Taylor, 2012). These studies made the following observations: data warehouses can extract and clean data from university departments; data warehouses manage data and information of universities and design them with a proper structure; the huge storage capacity of data warehouses allows the saving of all data and information in one place; data mining through data warehouses provides perfect statistics for university staff; data warehouse DSS can create reports that can assist university decision makers. These features can be utilized to achieve high-quality education for university systems. Based on the reviews of data warehouse's potential, this study attempted to investigate the use data warehouses inIraq higher education in order to provide high-quality data and information.

2.9.5 Data Warehouse for Electronic Information Sharing

Electronic information sharing aims to electronically share information among the government organizations and its decision makers (Bigdeli *et al.,* 2012). This availability of information allows decision makers to make effective decisions efficiently (Qi & Quan-hong, 2011). The government also attempts to improve electronic information sharing among its agencies that require multiple data sources. Different data sources indicate that data are dependent on different sources, such as SQL, MySQL, and Oracle. Therefore, multiple DBs of information sharing systems are considered as an important issue in organizing and managing information for agencies. In this case, data warehouses are effective platforms for electronic information sharing (Cuiling, Tianhe & Guojun, 2006).

Data warehouse technology can solve the issues on electronic information sharing for agencies because this technology can establish a sharing platform for government systems (Cuiling, Tianhe & Guojun, 2006). Government systems that depend on data warehouse techniques can enhance the effectiveness of large amounts of government data, improve information sharing, and support decision-making processes (Huang, Dang, Cheng, Peng & Zhu, 2010). The proper integration process, modeling data structure, and common storage that data warehouses provide can add extra value to information and knowledge sharing among these agencies (Nimmagadda & Dreher, 2007). For example, the senior leaders of the Fossil Power Plant use the data warehouse platform to share data services. The platform architecture is a multi-layer framework model (Qi & Quang-hong, 2011). The model is presented in Figure 2-16.

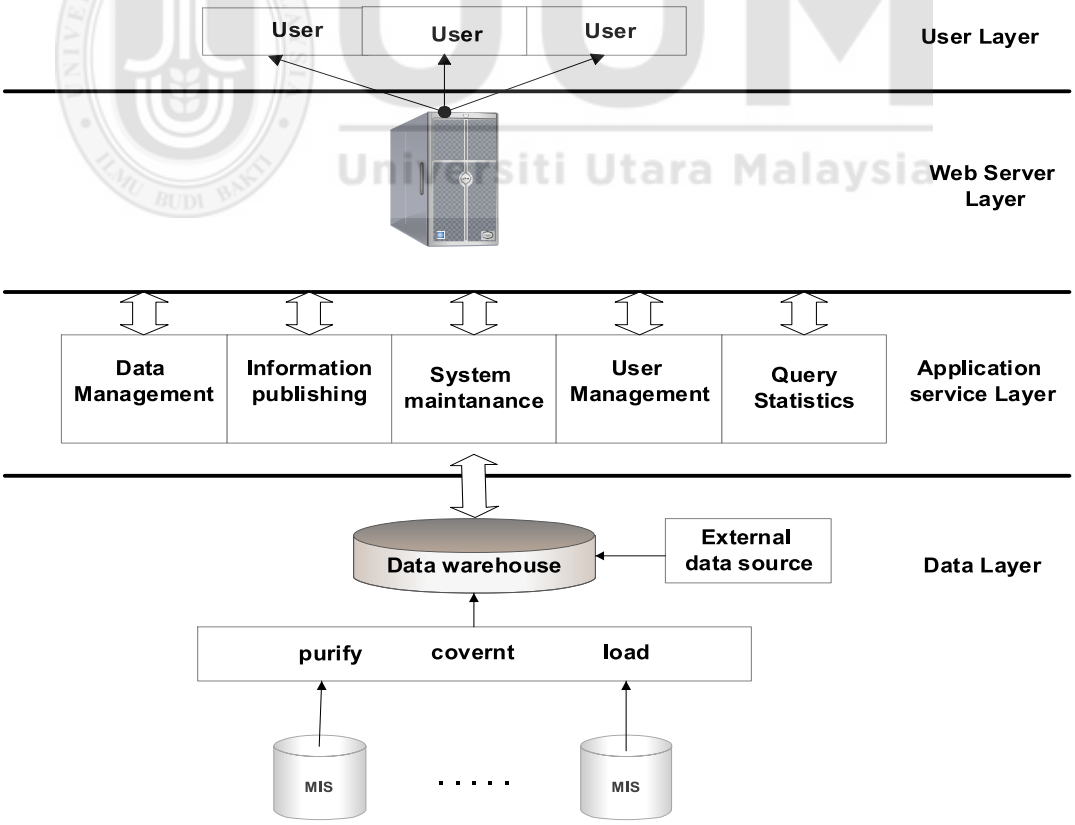

Figure 2.16. The structure of data warehouse to build a platform of information sharing (Qi & Quang-hong, 2011).

Moreover, in China, for example, data warehouse framework designed and implemented information sharing. It consists of three layers: data acquisition layer, data warehouse construction layer, and front-end management layer. All jobs are focused on the data warehouse construction layer. This layer deals with three sections: data organization and management scheme, data systemization, and DB storage (Cuiling, Tianhe, Peng, Guojun, 2006), as shown in Figure 2-17.

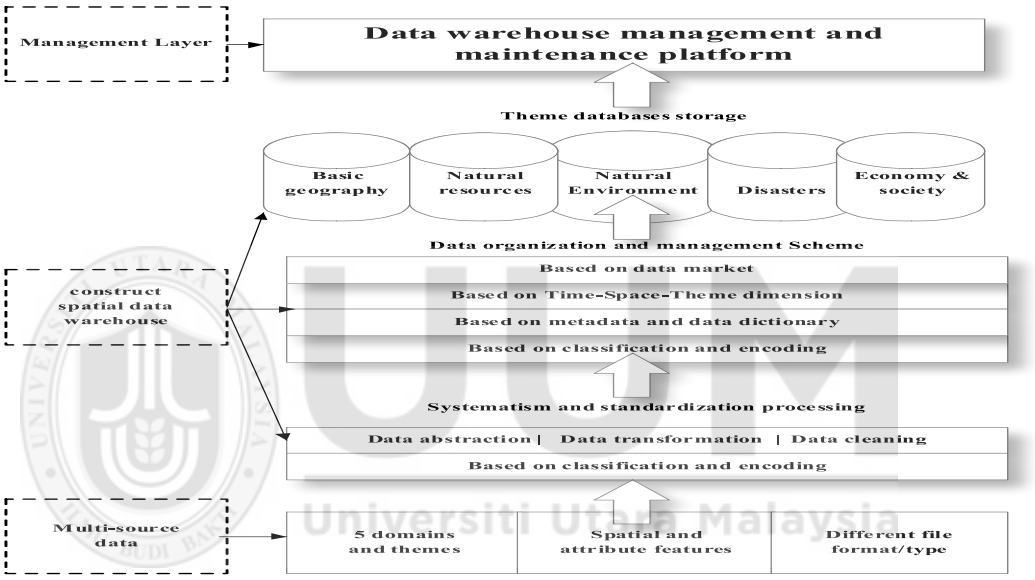

Figure 2.17. Data warehouse framework to develop information sharing in China (Cuiling, Tianhe, Peng & Guojun, 2006).

Information sharing problems exist because of separate DBs. According to Yang, Zheng, and Pardo (2012), the central information system of government agencies can assist in improving information sharing. Most of the databases can not be shared or are shared with a small group of repositories, but the results of sharing are extremely high cost (He-jiang, 2010). Most recent studies have mentioned that the use of data warehouses can increase the availability of data and information for users as well as it can increase the information sharing (Akbulut, 2003; Akbulut *et al.,* 2009; Ariyachandar & Waston, 2010). These studies (Cuiling, Tianhe, Peng & Guojun,

2006; Thomas, Srivastava & Prakash, 2010; Qi & Quang-hong, 2011) serve as a basis of this thesis. As data warehouses can provide monumental data, structural data, and designed data, they are considered as a good platform for information sharing.According to Huang, Dang, Cheng, Peng & Zhu (2010), data warehouse can improve the efficiency of data largely, achieve the maximum information sharing and support decision-making in digital urban planning system because it is better than the relational database in the field of integrating data and collecting the information.

Studies in the last few years have used DW technology and data warehousing tools to solve the government problems (Hu, 2010; Liu & Luo, 2010; Suresh & Mahale, 2011; Bhanti *et al.,* 2011). Moreover, the central information systems (as a data warehouse) can assist government agencies in increasing information sharing among them (Qi & Quang-hong, 2011; Yang, Zheng & Pardo, 2012). Nevertheless, these electronic information sharing studies did not mentioned about the use of common data warehouse techniques instead of traditional databases to increase sharing the information electronically (Akbulut, 2003; Gil-Garcia, Pardo, 2005; Jing & Pengzhu, 2007a, 2007b, 2009; Yan, Sun & Wang, 2009; He-Jiang 2010; Estevez, Fillottorani and Janowaski, 2010; Lu, Liu & Pei, 2011; Yang & Maxwell, 2011; Kamal, Singh & Ahmed, 2012;Bigdeli, Kamal, & deCesare, 2011, 2012, 2013a).

According to Chen, Chen, Huang and Ching, (2006), developing countries should consider their own e-government systems in order to learn from developed countries' successful e-government implementation strategies, and then work out their e-government implementation strategies that fit with their countries' characteristics and conditions. Iraqi Government, however, is still in the early stage of building up ICT

infrastructures. Thus, at this stage, government sectors and in specific Iraqi higher education sector should learn from the developed countries and start from advancing level of the technologies in order to jump the issues that the developed countries faced while using multi-databases to store their data and information. Therefore, advanced technologies such as data warehouse can help and support the Iraqi government and also can decrease the problems and invest time, effort and cost.

Based on these studies of data warehouse, it is identified that the most important aspects data warehouse can provide to support electronic information sharing are as follow:

- Huge information can be available to the users.
- Information can be accessible to every authorized person.
- Provide high-quality information.
- Integrate information by using a standard format.
- Provide compatibility with software and hardware.
- Decrease the interruption of information.
- Historical data and information can be shared.
- Provide real-time information to get high timeliness.
- Decrease the costs of information sharing.

Thus, this study uses these features in order to make data warehouse an electronic information sharing factor in order to increase the information sharing between Iraqi public universities and MOHESR.

2.10 Theoretical Foundation of Adopting Electronic Information Sharing

The limitation of research in the academic area of electronic information sharing (Bigdeli *et al.,* 2013b) gives more encouragement to develop a theoretical model that enables the influence factors affecting public organizations electronic information sharing to be identified and categorized (Akbulut *et al.,* 2009). Electronic information sharing in this study is viewed from an innovation perspective. An innovation represents an idea, practice, or object that is perceived as new by the unit of adoption (Rogers, 1995). As such, an innovation might refer to a new technology or renewal in terms of thought and action (Thong, 1999). Electronic information sharing between universities and Ministry of Higher Education and Scientific Research typically requires the introduction of new technologies and new ways of thought and action. Moreover, decision making about adopting inter-organizational systems that assist information sharing has become essential to researchers in Information Systems field (Pardo and Tayi, 2007). In the last decade, many studies have described and analyzed a different kind of factors that have an effect on the environment, intra-organizational and inter-organizational of adoption information sharing in government (Bigdeli, 2012b).

Technology Organization Environment is based on the adoption of technologies and innovations in the organization. Therefore, the adopted Technology Organization Environment (TOE) framework developed by Tornatzky and Fleischer (1990) was selected as a guide for the investigation in this study. The framework has been successfully utilized to explain the adoption of diverse information technologies, including inter-organizational systems (Iacovou *et al.*, 1995; Chau and Tam, 1997; Ramamurthy, Premkumar & Crum, 1999). These studies have demonstrated

consistent support for TOE's ability to provide a comprehensive perspective on innovation adoption while facilitating the flexibility to identify and categories unique factors that may emerge in particular situations (Zhu *et al.*, 2003).

The main reason for selecting this framework is due to its potential to address the issues in this study. According to Kurnia and Johnston (2000), any adapted framework needs to be developed and refined to match the context it is applied to within a certain period of time. As mentioned earlier, most of the previous studies on electronic information sharing focused on factors, in which they assumed that the outcomes of technology adoption are determined by a number of variables known as factors identified at a particular time (Rukanova *et al.*, 2009). As depicted in Figure 2-18 TOE suggests that technological innovation adoption is influenced by four contexts – technological, electronic information sharing, organizational (*i.e.*, university), and environmental.

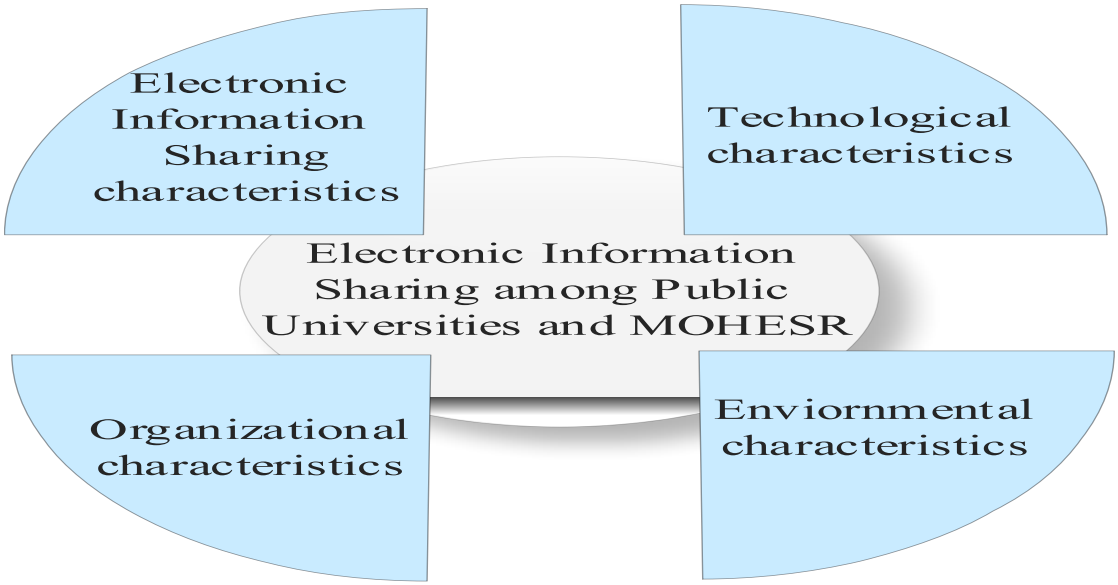

Figure 2.18. A theoretical model of electronic information sharing- adapted from (Tornatzky and Fleischer, 1990).

The technological context focuses on the characteristics of the technology that can influence adoption. In this study, the technological context represents a university's perceptions regarding the ICT that use in electronic information sharing project. Electronic information sharing contexts refer to the influence factors of information sharing. The organizational context, which is herein referred to as the *agency context*, represents the characteristics of a university. The *environmental context* refers to the characteristics of the external environment in which a university operates. Combined, the technological, electronic information sharing, organizational, and environmental context are proposed to influence electronic information sharing by a university. These four characteristics have been proved by the interview (APPENDIX A).

2.11 Transactive Memory System Theory

According to Wenger, Giuliano and Hertel (1985), to create a transactive memory is to obtain a certain communication process such that two minds perform as one. Thus, any two people who use same language and culture have an easy transactive memory (Wenger, Giuliano and Hertel, 1985). Moreover, it consists of three stages called encoding, storing, and retrieving information (Wegner, 1986). Wegner *et al.*, (1985) and Wegner (1986) observed that the improvement of shared memory depended on the fundamental theories of the group mind. Transactive memory helps individuals to focus on their memory efforts to the pair's assistance.

Memory systems possessed developing group mind which is not visible to the individuals. A shared system allows storage and access to information and knowledge, thus, only authorized person should be included. According to Wenger, Raymond and Erber (1991), the best way to understand the transactive memory systems is by

understanding the memory sharing in computer systems. Some computers do memory sharing easily by reading and writing from the same electronic memory repository. This means computer systems share memory easier than humans because computer systems share their memory even if they are separated based on developing communications of the memory (Wenger, Raymond & Erber, 1991).

Certain computers which have memory systems physically separated can be programmed in order to share memory by creating a directory in every separate memory system that consists abbreviated information of the contents of different memory systems (Mason, 1987). Memory systems which are physically separated can be easily reachable however depending on other computer processors which have a connection to every system to the extent that every memory system consists the latest information of the organization and general contents of the other systems (Wenger, Raymond & Erber, 1991).

From this theory, sharing or accessing information and knowledge between minds or storages is an important transaction. Thus, nowadays the concept of the common repository is very useful. According to Akbulut (2003, 2011) and Akbulut, Kelle, Pawlowski, Schneider, and Looney (2009), a common repository such as data warehouse can provide indirect information sharing. Moreover, electronic information sharing can be achieved by giving access to the information (Dawes, 1996). According to these findings, data warehouse as a factor has been applied in this study in order to discover the influence of it to increase electronic information sharing.

2.12 Social Exchange Theory

According to the social exchange theory, the result of a respondent's behavior was based on the responsive conduct of other respondents in an inter-organizational relationship (Son *et al.,* 1999). According to Premkumar and Ramamurthy (1995), social exchange theory supplies the basics in the study of relationships among organizations. IS researcher has initially utilized this theory as a basis to explore and observe the factors that influence inter-organizational relationship from a non-economic perspective (ibid). The social exchange theory formulates a theoretical background so as to observe and monitor non-profit inter-organizational operations (Humphreys *et al.,* 2001). When the relationship and partnership among different entities do not necessarily have any economic outcome, this theory can be applied to the argument. According to Son *et al.,* (2001), the factors derived from this theory, namely: power, trust, interdependence and conflict, have been observed in dissimilar empirical research in order to analyze different features of inter-organizational relationship and collaboration.

"Trust" and "Power" are recognized as two essential social factors that play important roles in the process of decision making towards participation in electronic information sharing on inter-organizational information sharing (Akbulut *et al.,* 2009). Inter-organizational trust is explained as a company's faith that a different company or department will execute the actions that will provide positive results, and simultaneously not undergo unpredicted actions that could give negative results for the company (Anderson & Narus, 1986).

According to Gil-Garcia *et al.,* (2010), inter- organizational trust can supply affirmative prospect and buoyancy to the other side of the relationship so as to establish the efficiency of the departmental network and achieve common goals. There is disparity between interpersonal trust and inter- organizational trust whereby inter-organizational trust decreases conciliation cost and clashes, and promotes performance in networked collaboration; however interpersonal trust is unable to give such significant effects (Zaheer, McEvily & Perrone,1998).

"Power" is also a factor that manipulates any inter-organizational, and it is defined as the ability of the field to apply control on a different field to act in a predicted circumstance (Hart & Saunders, 1997). It is considered that based on its needs, low power side of the relationship can be highly manipulated by the other powerful organization (Saunders & Clark, 1992). The role of power in inter-organizational relationships has been studied with regards to the interdependency among organizations. According to Ganesan (1994), in order to achieve an aim and ambition, dependency between organizations in a networked collaboration environment must be preserved. Most of the studies do not point out the limit that power can manipulate inter- organizational relationships and they explained that anyhow an organization should have considered a number of activities; power could not be the reason to the action's happening.

2.13 Critical Mass Theory

Critical Mass Theory is defined as a different point of view that can be useful to describe the execution of new technological modernization (Bouchard, 1993). This theory studies the implementation of the novelties that require collaboration among the participants. The decision of organizations' participants depends on the number of organizations that have already been implicated or will be involved soon (Hall & Khan, 2003; Bouchard, 1993). The supreme decision of an organization to employ the innovation itself might not manipulate any novelty; however it could be influenced by the number of partners and competitors who already implemented it (Kuan & Chau, 2001).

Critical mass theory can provide an outcome in the construction of confident network externalities that pass on to the positive external using benefits as a consequence of technology utilized (Lou *et al.,* 2000). It is also referred as the user of new technology that might have more advantage as the number of users for the technology augments. The existence of network externalities has two essential influences on technology implementations such as: increasing number of new technology users would make the potential users estimate the technology to be more attractive and efficient and; existing users behave as a positive advertiser for the non-users so that they start to make use of the novel technology (Lou *et al.,* 2000). Therefore, collaboration and network externalities must be acknowledged as a significant factor to attract more contributors to participate in the notion when inter-organizational electronic information sharing involves two or more organizations working together.

This study applies the three theories; Transactive Memory System, Social Exchange and Critical Mass Theory as the foundation for the study to identify factors of electronic information sharing. .Data warehouse factor have been investigated from the literature, and it has been supported by Transactive Memory System Theory. Factors identified from the Social Exchange Theory are upper-level leadership, top management support, trust, relationship, and collaboration, while from Critical Mass Theory are critical mass and collaboration. The TOE framework is the root of Diffusion of Innovations Theory which means a number of participants can affect the electronic information sharing. Thus, size factor has been investigated base on TOE framework. Finally, many factors have been added based on the previous studies of electronic information sharing.

Trust, Top management support, Upper-level leadership, Collaboration, Social Network, Size, Critical Mass and Data warehouse factors have been investigated based on the theories. Researcher in this study aimed to present a more efficient model through combining significant factors from previous studies with the factors related to applied theories in this research in order to present a more effective model. These Additional factors such as Benefits, Risks, Costs, IT capability, Information quality, Complexity, Compatibility and Policy/Legal framework can enhance the efficacy of the electronic information sharing system.

2.14 Previous Studies of Electronic Information Sharing

According to Akbulut, Kelle, Pawlowski and Schneider (2009), Akbulut (2011), Bigdeli *et al.,* (2013), there are insufficient studies on electronic information sharing studies between government organizations or agencies). This section investigated some related studies in different countries.

2.14.1 Electronic Information Sharing in the United States of America

An example of an outcome of the limitation electronic information sharing in the United States was the 9th September 2011 terrorist attacks (Jing and Pengzhu, 2007, 2009; Akbulut *et al.,*2009). In this situation, some government agencies had some information about the terrorist attack, whereas others did not (Akbulut, 2003; Atabakhsh *et al.,* 2004; Jing & Pengzhu, 2007a, 2009; Akbulut *et al.,* 2009; Abaas, Shibghatullah & Jaber, 2014).

One study was conducted by the local law enforcement agencies in a Southern state of the US. The surveys were sent out to the sheriff or police chief in charge of each agency. A total of 378 agencies were involved. The study investigated three main contexts that influence the electronic information sharing.Akbulut (2011) made a beneficial contribution by identifying and examining the influence factors of electronic information sharing among government agencies (between local and state government) so as to increase and integrate the information among them to support the decision making. The contexts of electronic information sharing in the US are technological, agency and environmental contexts.

Technological contexts refer to technologies that can build electronic collaboration among government agencies (Bigdeil *et al.,* 2012). Kamal, Singh, and Ahmed (2012) indicate that information sharing and technology are practically linked with each other because information sharing is considered an IT project (Yang and Maxwell, 2011). Agency contexts refer to the internal effects that have an influence on agencies, thus encouraging the employee to share information electronically with other agencies (Akbulut, 2003). Environmental contexts can provide the external effects of the environment on the operations of government agencies (Akbulut, 2003; Akbulut, *et al.,* 2009).

According to Akbulut, Kelle, Pawlowski and Schneider (2009), Bigdeli, Kamal & de Cesare, 2013b and Yang, Pardo and Wu, (2014), studies on electronic information sharing between the government agencies are few, and these studies used the databases as separated data storage (Kamal, Singh & Ahmed, 2012). Information sharing based on multi data sources such as several databases, documents, images and text files. Therefore, this diversity of resources would cause many critical problems (Lam, 2005; Pardo and Tayi, 2007). Moreover, according to Akulut (2011), the data warehouse can be used to share information electronically. Thus, based on this knowledge, the data warehouse has been used in this study as a factor to increase electronic information sharing between public universities and MOHESR.

Some of these factors have been investigated based on Akbulut research such as Benefits, IT capability, complexity, compatibility, and policy/legal framework (Akbulut, 2011). Benefits, IT capability, and complexity has been found as a significant factor in Akulut's study. Moreover, these three factors with Compatibility

factors have been investigated base on Diffusion of Innovations Theory (DOI). Akbulut mentioned that Policy/legal framework has an important influence to organize the electronic information sharing.

2.14.2 Electronic Information Sharing in the United Kingdom

Electronic information sharing participation in the local government authorities level was limited in United Kingdom (UK) (Bigdeli, 2012). This limitation happened because of the complexity of organizational and technological structures of these local authorities (Bigdeli, *et al.,* 2012). Therefore, Bigdeli, Kamal and de Sergio research was applied to support the decision making in local government authorities by increasing the participation in electronic information sharing among them (Bigdeli, *et al.,* 2013a).

Bigdeli, Kamal and de Sergio (2012), identified electronic information sharing factors to enhance decision making in local authority government in the United Kingdom. Their research was based on five main characteristics that influence inter-organizational system, namely (a) External Environment, (b) Capability of Organization, (c) Technology Environment, (d) Electronic Information Sharing Characteristics and (e) Inter-departmental Environment. They identified the factors by investigating literature on innovation adoption in the public sector, information sharing in governmental settings, inter-organizational systems adoption, inter-departmental collaboration and enterprise application integration.

- **External Environment**

External environment refers to the external factors that affect the electronic information sharing in local government such as Political Pressure, Economic Pressures, Legalization, and Policy Principles and Community Pressures (Pardo and Tayi, 2007; Akbulut *et al.*, 2009). Political pressure has an influence on decision-making processes of central government, and it also affects the collaboration network, design, implementation and adoption of inter-organizational systems (Fedorowicz Gogan& Williams, 2007; Pardo & Tayi, 2007). Economic pressures mean the central government economic may affect the collaborations at the local level (Fedorowicz, *et al.*, 2007). Information sharing needs policies to create an effective sharing environment among departments (Bigdeli *et al.,* 2012). Community pressures refer to data privacy and data protection which have influential effect of making a decision of sharing personal information or not in public departments (Bigdeli *et al.,* 2012).

- **Organizational Environment**

Organizational environment refers to organizational factors that influence electronic information sharing in local government. These include leaders, collaboration, return of investment and size. Electronic information sharing between departments in the organization is based on collaboration and relationship (Gil-Garcia *et al.*, 2009; Fedorowicz *et al.*, 2007; Pardo and Tayi, 2007). Inter-organizational leadership is the ability and commitment of top management to provide optimistic support for electronic information sharing (Gil-Garcia *et al.*, 2007; Bigdeli *et al.,* 2012). Return on Investment refers to the analysis of costs and benefits of information sharing in tangible and intangible ways (Bigdeli *et al.,* 2012). Network collaboration culture refers to network collaboration between departments (Gil-Garcia *et al.*, 2007). The size

of Organization can measure base on resources of organizations, volumes of transaction and size of workflow (Akbulut *et al.,* 2009).

- **Technology Environment**

Technology environment refers to technological factors that influence electronic information sharing in local government. The factors include IT capabilities, data security, Information Quality and interoperability framework. In general, IT capabilities are the ability of the department to effectively apply IT tools to share information electronically with others (Akbulut *et al*., 2009). The limitation of data security and privacy reduced public trust and confidence in a department (Bellamy and Raab, 2005; Nash, 2008). Information quality can improve the collaboration among departments and can enhance the quality of service (Klischewski and Scholl, 2006; Corradini, De Angelis, Polzonetti & Re, 2006; Klischewski and Scholl, 2008). Interoperability framework refers to compatibility standards of adopting information system among organizations (Dos Santos and Reinhard, 2007).

- **Electronic Information Sharing Characteristics**

Electronic information sharing characteristics refer to factors that may encourage the organization to participate in electronic information sharing. Cost refers to all costs of participating in electronic information sharing, such as the cost of hardware, software, costs of migration from the old systems to new and cost of staff training (Akbulut *et al.*, 2009; Gil-Garcia *et al.*, 2009). Benefits of electronic information sharing in inter-department in the public sector can give more encouragement to departments to share their information (Gil-Garcia *et al*., 2007). The risk of electronic information sharing can be divided into two types, technological risks and non-technological risks

(Evangelidis, 2005). Technological risks refer to risks of adopting new information systems to build information sharing. Non-technological risks refer to share sensitive and personal information (Bellamy *et al.*, 2007).

- **Inter-departmental Environment of Electronic information Sharing**

It refers to the relationship among departments and also their business and operational processes (Bigdeli *et al.,* 2012). The usefulness of electronic information sharing in the public organization would only save budget and enhance performance if the decisions and business processes are not aligned or merged (Fedorowicz *et al.*, 2007; Pardo and Tayi, 2007). Trust can reduce the conflicts and risks between departments while share their information (Gil-Garcia *et al.*, 2009). The critical mass means numbers of participants can encourage other departments which have not started to share their information yet (Akbulut *et al.*, 2009). However, the framework of Bigdile *et al., study* is shown in figure 2-19.

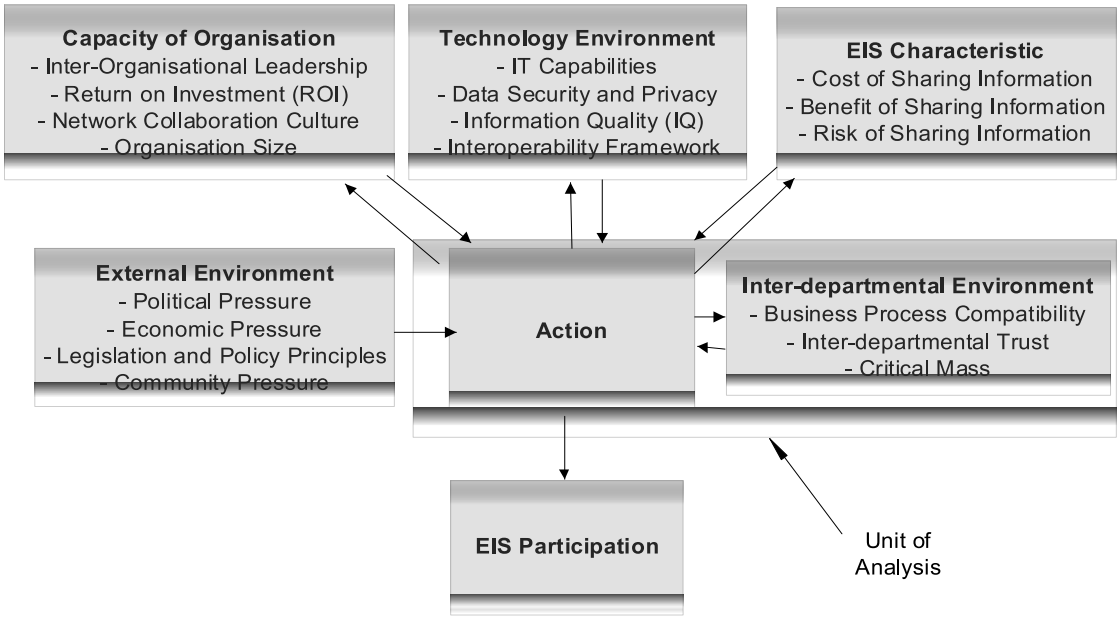

Figure 2.19: Electronic information sharing in Local Government Authority (Bigdeli et al,. 2012).

Moreover, Bigdeli *et al.,* (2012) research has mentioned the electronic information sharing issues by using multi-databases. These issues include multi data sources, different data format, incompatibility of software and hardware. In relation to this, this study decided to include data warehouse as one factor in order to solve these issues.

Based on Bigdeli *et al.,* (2012), many important factors can be noticed to have influence in increasing the electronic information sharing. Thus, information quality and collaboration factors have been adopted in this study based on Bigdeli et al., (2012). Information quality and collaboration are the main key factors in electronic information sharing. Information sharing is among the factors that can influence the decision making about sharing information. Therefore, it can be so important in this research. Information quality and collaboration factors have been identified based on qualitative research in UK. Thus, they are being investigated in this quantitative research.

2.14.3 Electronic Information Sharing in China

E-government in China has been built based on different information systems in every government agencies (Jing and Pengzhu, 2007b). Thus, electronic information sharing has been limited in the vertical functioning because of these differences (Jing & Pengzhu, 2009). Moreover, this has led to information isolation and inconsistent information among agencies example, fakes information (Jing, Pengzhu and Yen, 2014). Additionally, according to Jing, Pengzhu and Yen (2014), limited information sharing among agencies let the agencies in China provide discrete services to public, private and citizens, and tend to allow criminal activities.

Jing, Pengzhu and Yen (2014) identified a number of factors that affect electronic information sharing among government organizations in order to deliver better pubic services in China. Jing, Pengzhu and Yen (2014), developed a four-layer model of information sharing across horizontal functional agencies based on layered behavior model. Each layer has defined some electronic information sharing factors within Chinese contexts; this layers are discussed as follows:

- **External environment layer**

This layer refers to the external factors that are important to develop the electronic information sharing between the central and local governments. Law and policy and Upper-level Leadership are the main two factors in this layer. The law and policy can guide the government organization to adopt electronic information sharing project (Jing, Pengzhu & Yen, 2014). There is a need to a high level of authorities in order to collect and coordinate all the functional in the public organizations (Jing, Pengzhu & Yen, 2014). For example, in China, because of the un-proper government structure, most of the super-managerial agencies except State Council have no direct leadership on the functional organization. That leads to a great challenge for their work.

- **Interagency partnership layer**

It refers to the factors that influenced the relationship between agencies' participants in order to build a good environment to achieve their aims (Jing & Pengzhu, 2009). The factors include Inter-agency Trust, Guanxi and Compatability. The trust bases on the validity and accuracy of information that collected from other public organizations (Jing & Pengzhu, 2009). Moreover, the organization is not sure that other will use its data or information in the right way. GuanXi is a Chinese word refers to interpersonal

or inter-organizational relationships, social networks, commitment and favor (Shin, Ishman & Sanders, 2007). Organizational compatibility refers to the existed needs, aims, process and cultures in electronic information sharing among government organizations (Jing *et al.,* 2014). Technical compatibility refers to the integrated level of information system and application between organizations. The challenge in electronic information sharing is public organizations use different information systems. Moreover, data in the public organizations use a different format; there is no organization ready to change the format of its data (Jing & Pengzhu, 2009). Electronic information sharing is so difficult due to organizations follow different data definitions standards of data transmission (Jing & Pengzhu, 2007b). Furthermore, organizations can solve these issues by integrating their information systems, but that will cost a lot (Jing & Pengzhu, 2009).

- **Organizational readiness layer**

It refers to the capability of the organization to participate in electronic information sharing project. Electronic information sharing gives low beneficial feedback without top manager support (Jing & Pengzhu, 2007; Jing *et al.,* 2014). Most public organizations have limitations of software, hardware, and information sharing skills (Jing & Pengzhu, 2009). Costs of electronic information sharing in inter-organizational consist of setup cost, running cost, integration cost, maintaining cost as well as training cost and communication cost (Jing, Pengzhu & Yen, 2014). Therefore, who will pay the fees of electronic information sharing was considered as the most common question among government organizations (Jing & Pengzhu, 2009).

- **Individual expectation layer**

It refers individual factors that influence electronic information sharing between local and central government. Electronic information sharing project assists government organizations to achieve several benefits, such as increased information accuracy and timeliness, streamlined data management, and improved decision making (Jing & Pengzhu, 2009). The risk of electronic information sharing in a government organization is decentralized the power of organization (Jing & Pengzhu, 2009). Therefore, electronic information sharing can enhance the efficiency and effectiveness of public organization, which may be against some political interests because it decreases the political power (Jing, Pengzhu & Yen, 2014).

- **Performance of government to Electronic Information Sharing**

It refers to the achievement of government organization from electronic information sharing project, such as the degree of administrative, financial, and other benefits (Jing, Pengzhu & Yen, 2014). There are three important aspects of government to government electronic information sharing. First, the volume of information obtained from other agencies. Second, the value of information that provided to other organization. Third, the degree of information that shares electronically between organizations. The model of Jing's is shown in figure 2-20.

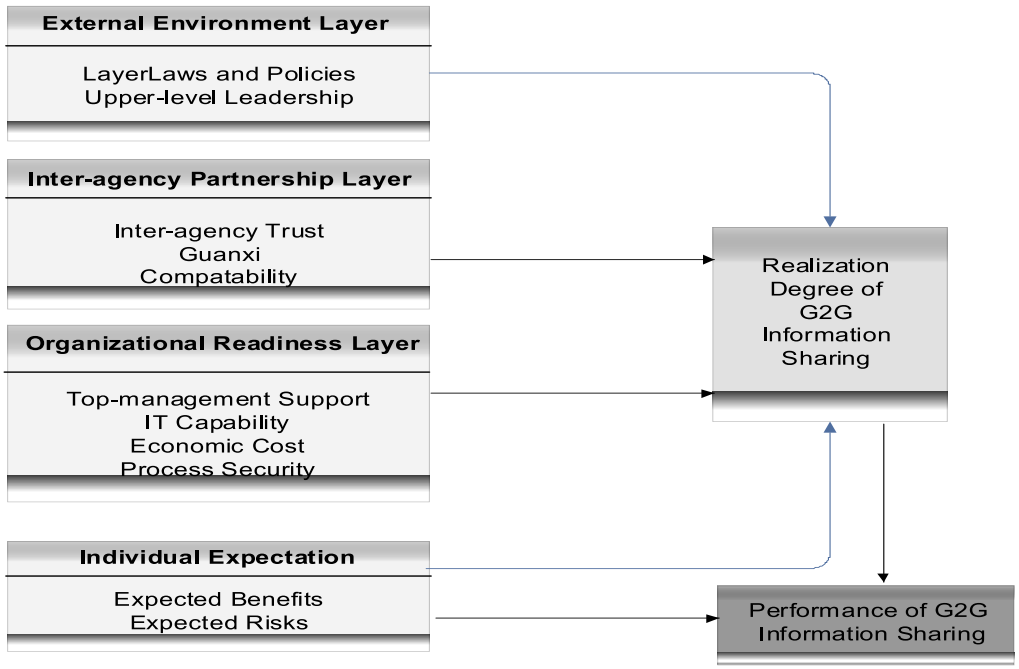

Figure 2.20. Model of influencing factors on G2G information sharing (Jing, Pengzhu & Yen, 2014).

Moreover, their study also highlighted technological electronic information sharing issues when using multi-databases, which include multi data sources, different formats, incompatibility of software and hardware. Therefore, in this study, the data warehouse has been included as one factor instead of multi-database.

Based on Jing, Pengzhu and Yen, (2014), many important factors have been identified to increase electronic information sharing. Thus, upper-level leadership and GuanXi (social network) factors have been adopted in this study (Jing, Pengzhu and Yen, 2014). Upper-level leadership and social network have been found as significant factors to increase the participate in electronic information sharing in the Chinese government. The Higher education sector has independence roles from the government. Therefore, this study investigated these factors in different environment such as higher education sector in Iraq. Family and friends are among the specific

aspects in the Iraqi culture. Thus, the social network could have the influence to increase the electronic information sharing participation in Iraqi higher education sector.

Moreover, from the previous studies, the important gaps in the current studies of electronic information sharing are as follow:

- Limited studies on electronic information sharing studies in vertical or horizontal functioning between government organizations.

- Electronic information sharing studies in public sectors mainly focus on multi use databases to store the information which creates several limitations, such as availability and accessibility of data and information. Moreover, multi-databases make technical incompatibility, such as different data format, different data definitions, standards of data transmission and integration of information as well as the quality of information.

- Most of the proposed frameworks and models focused on electronic information sharing between government sector with a minimum focus on the higher education sector.

- Insufficient studies on vertical electronic information sharing in inter-organizational aspect in public organizations in Iraq.

2.15 Conclusion

This Chapter investigates relative work of electronic information sharing in public organizations to identify the research issues in Iraqi public universities. It began with the identify of information sharing in public organizations, then the description benefits and challenges facing the public organizations in order to share their information electronically with others. This chapter reviewed the studies of electronic information sharing that applied in different environments. This reviewing illustrated the limitations of these previous studies. One of these limitations is technological issues of electronic information sharing. However, it also clarified the Higher Education in Iraq, structure of higher education, centralization and decentralization, and the ICT in Iraqi higher education.

The chapter further discussed about database and data warehouse, and the differences between them. It also described the potential uses of the data warehouse in the public organization and in higher education sectors (university level and Ministry level). Moreover, it discussed about the application of data warehouse in information sharing as a potential factor to solve the technological issues in inter-organizational electronic information sharing. Finally, the chapter presented the foundational model of this study, which was set up based on three theories; Technology Organization Environment(TOE) framework of Tornatzky and Fleischer (1990), Transactive Memory Systems Theory (Wenger, Raymond and Erber, 1991), Social Exchange Theory (Emerson, 1976), and Critical Mass Theory (Bouchard, 1993) in its way to find the factors that influence electronic information sharing between Iraqi public universities and MOHESR.

CHAPTER THREE

THEORETICAL MODEL AND HYPOTHESIS

3.1 Introduction

Chapter Three describes the theoretical model which consists of four characteristics named; electronic information sharing, technological, organizational and environmental. Moreover, sixteen factors have been explained and hypothesized which called Benefits, Risks, Risks, IT capability, Information quality, Compatibility, Complexity, Data Warehouse, Top Management Support, Concept of Collaboration, Size, Policy/legal FrameworkInteragency Trust, Upper-level Leadership, Critical Mass and Social Network. The dependent and independent variables have been examining involved in this chapter.

3.2 Theoretical Model

Sekaran and Bougie (2010) defined as a conceptual model of how to theorize or logically establish a relationship between many factors that have been identified as important to the problem of the study. From the theoretical model, the testability of hypotheses could be determined and the validity of the formulated theory could be examined. The foundational model has been defended as mentioned in Chapter Two (section 2.11, page 72). Moreover, the electronic information sharing factors have been identified and proposed based on three theories namely Transactive Memory System Theory, Social Exchange Theory and Critical Mass Theory. The influential factors of electronic information sharing between Iraqi public universities and MOHESR are benefits, risks, information quality, top management support, concept of collaboration,

size, information technology (IT) capability, costs, compatibility, complexity, policy/legal framework, interagency trust, upper level leadership, critical mass and social network. Chapter Two has also highlighted the importance of data warehouse in supporting electronic information sharing (section 2.10.5, page 67). Thus, this study highlights the DW platform as one of the factors that could potentially increase the electronic information sharing among organizations because the DW establishes a sharing platform, ensures the availability of information, and eases the access to information. Moreover, data warehouse can provide a high quality of information with the compatibility of software and hardware of information systems between higher education sectors. Finally, it can enhance the security by reducing the interruption of information while sharing them. Figure 3-1 illustrates the model of this study.

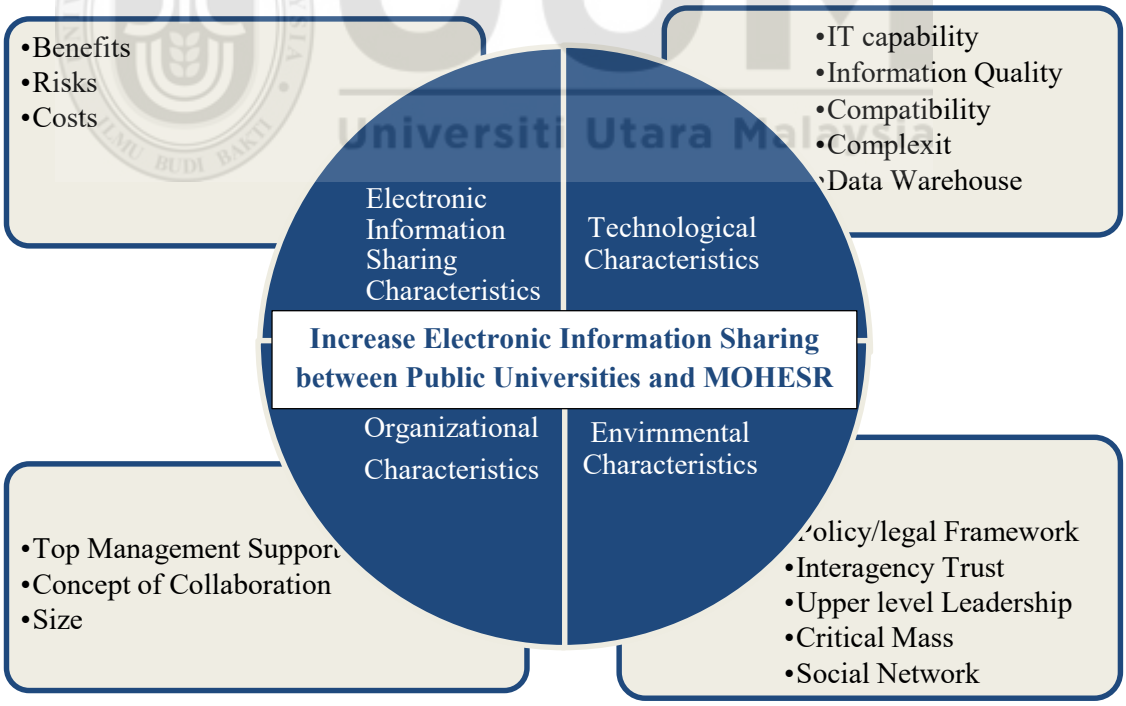

Figure 3.1. Model of Increasing Electronic Information Sharing between Iraqi Public Universities and MOHESR.

The model highlights the factors that could increase information sharing between the Iraqi public universities and MOHESR. Based on the literature review, this study has categorized factors based on four major characteristics that are deemed to influence the increase in information sharing. These characteristics are (i) electronic information sharing, (ii) organizational, (iii) technological, and (iv) environmental characteristics.

3.2.1 Electronic Information Sharing Characteristics

Electronic information sharing has characteristics that affect the means of electronically sharing information among government agencies (Akbulut, 2003). A number of characteristics affect electronic information sharing, such as cost (Yan *et al.,* 2009; Jing & Pengzhu, 2009; Estevez *et al.,* 2010; Bigdeil *et al.,* 2012), and benefits and risks (Jing & Pengzhu, 2009; Tie-nan, Juan, & Ai-li, 2010; He-Jiang 2010; Yang & Maxwell, 2011; Bigdeil *et al.,* 2012; Dawes, Gharawi & Burke, 2012). This study focuses on the following factors:

(a) Benefits

(b) Risks, and

(c) Costs

The previous studies about Iraq have pointed out the effectiveness and the important influence of these factors in increasing electronic information sharing among public organizations. According to Alwan and Abdurrahman (2010) and Ahmed, Jasem and Hassan (2012), benefits factor has significantly affected on electronic services among government organizations in Iraq. Risks and cost factors likewise have influential effects on electronic services between government organizations (Abdul-Alrahman, 2011; Ahmed, Jasem & Hassan, 2012; Asim & Ibrahim, 2013).Table 3.1 highlights the previous studies in China, United States, and the United Kingdom that evidenced

benefits, risks, and costs as the influential factors of electronic information sharing characteristic between public organizations. All these previous studies drove the investigation on these factors as the influence factors to increase electronic information sharing between public universities and MOHESR in Iraq.

Table 3.1

Influence factors of electronic information sharing characteristics

Author	Scope of Study	Benefits	Risks	Costs	Method	Finding
Jing and Pengzhu, 2009	G2G information sharing in Chinese context	EIS helps agencies to get more info. With less time to improve their decision-making	Managers and staff are scared from EIS because it distributes their powers	Cost is one of the influence factors of EIS	Layered Behavioral Model with Diffusion of Innovative Theory (DOI) to horizontal sharing, Interview.	The most obstacle factor is cost., leaders and staffs have realized the benefits and risks of EIS are important factors.
Akbulut, Kelle, Pawlowski & Schneider, 2009	EIS between the state and local law enforcement agency in Minnesota, US	EIS helps agencies to achieve benefits, such as increased information accuracy and timeliness, reduced paperwork, freed up resources, expedited data management, and improved decision-making.	Local agencies wanted to have full control of the information. Local agencies resisted sharing information because they wanted to protect their territory from external interference.	Financial capability refers to the availability of financial resources that a local agency needs to share information electronically.	Technology-Organisation-Environment (TOE) framework to across Interorganizational, interview	Benefits have influence effect on electronic sharing information. Risks played a significant role in EIS in a local agency. Agency's financial strength influenced EIS.
Akbulut, 2011	Information sharing between state and local law enforcement	Perceived benefits play an important role in motivating government agencies.	Threats refer to the potential threats associated with information misuse and misinterpretation	Financial capability refers to the availability of financial resources a local agency needs to share information electronically.	Technology-Organisation-Environment (TOE) framework with DOI and Critical Mass Theory to across Interorganizational, Questionnaire	Benefits, risks, and costs have influence support in electronic information sharing between agencies
Bigdeli, 2012	EIS among many local government authorities in the UK	Benefits of innovation would positively influence the adoption process.	There is a strong and negative relationship between risk and EIS.	Economic pressures refer to the Central Government"s economic such as, level of employment, recession, and inflation that may influence inter-department	Typical Adoption Model with Factor Approach with Social Exchange Theory and Critical Mass Theory to share information among local government authorities, Interview	The benefits has influence effect; risks are the most important factor in EIS throughout the participation phases. The cost of implementing and adopting the IOSs in the departments.
Jing, Pengzhu & Yen, 2014	G2G information sharing among agencies in China	Improve information quality, streamline the business process, increase administrative efficiency, enhance the ability of decision and policy-making, and reduce cost.	The risk of information misuse, exposure of sensitive information and losing authority.	The cost of G2G information sharing is related to set-up, development, operating, maintenance, and communication and training costs.	Layered Behavioral Model with DOI to across horizontal functional agencies, Questionnaire	Benefits, risks, and cost, are supported factors in this study

3.2.2 Technological Characteristics

Technological characteristics refer to the use of external and internal technologies to establish relationships and collaboration among government agencies (Bigdeli *et al.,* 2012). Kamal, Singh, and Ahmed (2012) indicate that information sharing and technology are practically linked with each other because information sharing is considered an IT project (Yang & Maxwell, 2011). Technology builds a good platform for creating a safe atmosphere within each agency, thus allowing the environment to measure the security of information sharing (Kamal *et al.,* 2012). For technological characteristics, IT is an effective and efficient tool for agencies for enhancing interagency collaboration (Yang & Maxwell, 2011; Bigdeli *et al.,* 2012) besides information quality (Bigdeli *et al.,* 2012), compatibility and complexity (Akbulut *et al.,* 2009). Data warehouse is also considered as technological information system (Jiang, Xu, Xu & Cai, 2011) thus, it can be included in this context. In summary, this study focuses on the following factors under technological characteristics:

(a) IT capability
(b) Information quality
(c) Compatibility
(d) Complexity, and
(e) Data warehouse

IT capability refers to the capacity to effectively apply IT to achieve electronic information sharing. It is the capability of providing software, hardware, and IT skills to public organizations. Information quality refers to the quality of information that shares among public organizations. Compatibility means the interoperability of IT in each government department. Every government organization needs to have compatibility in its software, hardware, and computer skills in order to provide a

suitable environment for electronic information sharing. Moreover, there is complexity of using the information sharing between organizations. These factors are important for the government systems of public organizations in Iraq (Alwan & Abdurrahman, 2010; Mahmoud, 2010; Abdul-Alrahman, 2011; Ahmed, Jasem, & Hassan, 2012; Fadhelalla, 2012). Table 3.2 shows the Influence factors of the technological characteristic based on previous studies. The table explains the IT capability, information quality, compatibility and complexity barriers in electronic information sharing in public sectors. It also illustrates the findings of five previous studies of electronic information sharing. The results varied among different cases. For instance, IT capability has a positive influence in one environment but has no effect in other cases as the influential factors in increasing the electronic information sharing among government organizations. Motivating by these findings. Thus, this study investigated IT capability, information quality, compatibility, and complexity as the technological factors that can potentially increase electronic information sharing amongst Iraqi public universities and MOHESR.

Table 3.2

Influence factors of technological characteristics

Author	Scope of Study	IT capability	Information quality	Compatibility	Complexity	Method	Finding
Jing and Pengzhu, 2009	G2G information sharing in Chinese context	Agencies should have good level of IT infrastructure and their employees have good IT skills		Org.compatibility refers to the fitness with the organization. Tech. Compatibility refers to the fitness of information sharing system.		Layered Behavioral Model with Diffusion of Innovative Theory (DOI) to across horizontal functional agencies, Interview	IT ability is not a significant obstacle factor for G2G information sharing in China. IT capability has no influence because they have good IT skills and infrastructure.
Akbulut, Kelle, Pawlowski & Schneider, 2009	EIS between the state and local law enforcement agency in Minnesota, US	IT capability refers to the availability of IT resources and expertise within a local agency that enables EIS		Two types of compatibility emerged from the case: technological and organizational compatibility.	Complexity refers to the degree to which EIS is perceived as a relatively difficult process.	Technology-Organisation-Environment (TOE) framework to across Interorganizational, interview	IT capability and EIS has a positive relationship. Agencies perceiving their existing information systems, functions, values, and objectives as compatible are more likely to share information electronically. Complexity has a good influence on EIS in a local agency.
Akbulut, 2011	Information sharing between state and local governments	IT capability refers to the availability of IT resources within a local agency that enables EIS.		Compatibility refers to the degree to which the technologies required for EIS are compatible with a local agency's existing information systems	Complexity refers to the degree to which electronic information sharing is perceived as a difficult process.	Technology-Organisation-Environment (TOE) framework with DOI and Critical Mass Theory to across Interorganizational, Questionnaire	IT capability has an important effect. Compatibility has no influence on EIS in this study. Complexity has influence effect on EIS among local government.
Bigdeli, 2012	EIS among many local government authorities in the UK	IT capability of the LGA departments was examined through three key variables; IT infrastructure, IT sophistication and IT knowledge.	Information quality (IQ) refers to the quality of information.	Information sharing efforts via integrated systems in organizational and technological interoperability.		Typical Adoption Model with Factor Approach with Social Exchange Theory and Critical Mass Theory to share information among local government authorities, Interview	There is not enough knowledge about the IT compatibility in LGAs. High IQ has positively influenced in EIS. Lack of awareness about the existence of interoperability has limited the implementation and adoption of the EIS initiative in the LGAs.
Jing, Pengzhu & Yen, 2014	G2G information sharing among agencies in China	It refers to the level of IT resources, IT expertise, and other IT skills within a government agency.		Compatibility of G2G information sharing requires both technological and organizational informational systems.		Layered Behavioral Model with DOI to across horizontal functional agencies, Questionnaire	IT capability has no influence support because all the agencies have good IT support and IT skills. Compatibility has influence support in this study.

3.2.3 Organizational Characteristics

Organizational characteristics refer to the internal factors that have an influential effect on government agencies, thus encouraging the staff to share information with other agencies (Akbulut, 2003). Researchers have recognized the importance of providing rich sources of electronic information sharing, especially in the e-government field (Yang & Maxwell, 2011; Bigdeli *et al.,* 2012, 2013a; Jing *et al.,* 2014). This study focuses on the following factor:

(a) Top management support

(b) Collaboration Concept

(c) Size

Top management support has an influential effect on the increasing of electronic information sharing in an organization. According to Alwan & Abdurrahman (2010), and Fadhelalla (2012), top management support is one of the important factors for Iraqi e-government because of the need to encourage the staff to participate by sharing information with others. Collaboration concept between staff in Iraqi government organization or between organizations is needed (Al-Taie & Kadry, 2013). Top management support, collaboration concept, and size factors have proven to have some effects in increasing the electronic information sharing among public organizations. Table 3.3 shows the influential factors of the organizational characteristic based on previous studies. The findings identified the influence of these factors in increasing the inter-organizations electronic information sharing. With this basis, thus top management support, collaboration concept, and size have been investigated as important factors to increase electronic information sharing between Iraqi public universities and MOHESR.

Table 3.3

Influence factors of Organizational characteristic

Author	Scope of Study	Top Management Support	Collaboration	Size	Method	Finding
Jing and Pengzhu, 2009	G2G information sharing in Chinese context	Leaders of government agencies are willing to participate in G2G information sharing.			Layered Behavioral Model with Diffusion of Innovative Theory (DOI) to across horizontal functional agencies, Interview	Leader's support is the most frequent factor in G2G information sharing in China
Akbulut, Kelle, Pawlowski & Schneider, 2009	EIS between the state and local law enforcement agency in Minnesota, US	Top management support refers to a positive environment that top manager provide to encourage EIS.		Large size organizations share information electronically base on readiness and availability of their information in the system.	Technology-Organisation-Environment (TOE) framework to across Interorganizational, interview	Top management support is clearly needed for sharing information electronically. Larger agencies possess superior institutional capabilities compared to smaller agencies., smaller agencies have fewer data to enter thus, they ar willing to share information electronically.
Akbulut, 2011	Information sharing between state and local governments	Top management support can encourage staffs to share information electronically by providing a positive environment.		Size can be measured in terms of the number of employees or the amount of organizational systems. Smaller agencies usually lack the resources and technologies needed to share information electronically.Large organization has the IT ability to share information electronically.	Technology-Organisation-Environment (TOE) framework with DOI and Critical Mass Theory to across Interorganizational, Questionnaire	Top management support has an important effect one electronic information sharing. Size of organization has supported the EIS
Bigdeli, 2012	EIS among many local government authorities in the UK	Inter-organisational leadership refers to the existence ability and commitment of top management to provide an optimistic environment for effective inter-departmental EIS.	The delivery and management of public services increasingly rely on collaborations among a variety of agencies and departments	Organizational size has been found to have a positive influence with regards to the organizational inclination to adopt an innovation.	Typical Adoption Model with Factor Approach with Social Exchange Theory and Critical Mass Theory to share information among local government authorities, Interview	Interorganisational leadership has a significant and positive influence on EIS. Poor collaboration in the departments has a negative influence on EIS. The size of the entire local governments was not found to be significantly influential.
Jing, Pengzhu & Yen, 2014	G2G information sharing among agencies in China	Top management within one agency appreciates the value of innovation and actively creates a favorable atmosphere the IT system			Layered Behavioral Model with DOI to across horizontal functional agencies, Questionnaire	Top manager factor has an important effect in this study.

3.2.4 Environmental Characteristics

Environmental characteristics denote the effects of the environment on the operations of government agencies (Akbulut, 2003). Researchers have cited the numerous influential effects from the external environment that the agencies cannot ignore (Jing & Pengzhu, 2007b, 2009; Bigdeli *et al.,* 2012). A number of environmental factors have been examined in e-government, such policy/legal framework and trust (Akbulut, 2003, Akbulut *et al.,* 2009; Jing & Pengzhu, 2007b, 2009).This study focuses on the following factors:

(a) Policy/legal framework

(b) Interagency Trust

(c) Upper-level leadership

(d) Critical mass

(e) Social network

Policy/legal framework, trust, upper-level leadership, critical mass and social network are the most influential factors in the external environment for each public organization. Iraqi public organizations environment should have policies and laws to support and encourage the staff in terms of electronically sharing information (Alwan & Abdurrahman, 2010; Abdul-Alrahman, 2011; Fadhelalla, 2012). Table 3.4 shows the findings of the previous studies on those environmental characteristics as the influential factors of electronic information sharing in government organizations. Thus, the findings illustrated the importance of these factors to increase the electronic information sharing among these organizations. This study therefore investigated policy/legal framework, trust, upper-level leadership, critical mass and social network factors as significant factors to increase electronic information sharing between public universities and MOHESR in Iraq.

Table 3.4

Influence factors of environmental characteristics

Author	Scope of Study	Policy/Legal Framework	Interagency Trust	Upper-Level Leadership	Critical mass	Social Network	Method	Finding
Jing and Pengzhu, 2009	G2G information sharing in Chinese context	Laws and policies refer to the existence of clear legal norm, regulation, or organizational procedures, formal process for carrying out organizational tasks.	Trust in the validity and accuracy of data collected and agencies are not sure if other agencies will use their data in the right way.	The Super-managerial agencies have enough authority in gathering and coordinating all the functional agencies.		GUAN-XI refers to interpersonal or inter-organizational relationships and places high values on social networks.	Layered Behavioral Model with Diffusion of Innovative Theory (DOI) to across horizontal functional agencies, Interview	Policies have not been enforced strongly enough, and many agencies haven't obeyed these policies due to their own benefits. Super-Managerial agencies except State Council have no direct leadership on functional agencies. That leads to great challenge for their work. Actually, the distrust exists although they didn't admit it. GuanXi among agencies can greatly increase interagency cooperation ability during the G2G information sharing.
Akbulut, Kelle, Pawlowski & Schneider, 2009	EIS between the state and local law enforcement agency in Minnesota, US	Lack of a policy/legal framework is one of the barriers to local agency EIS.	There are limited communication and understanding, between local and state agencies, resulting because a lack of trust.	State agency exerted various forms of power to increase EIS.	Local agencies were affected by the actions of similar agencies when they were making their decisions to share information electronically.		Technology-Organisation-Environment (TOE) framework to across Interorganizational, interview	The policy/legal framework is important factor in this study. The relationships between the local and state agencies had been problematic because they do not trust each other. Local agencies share information electronically by persuading or coerce. A number of agencies have encouraged other agencies to share their information electronically.
Akbulut, 2011	Information sharing between state	Information sharing can be difficult to achieve because of the	Trust can define as a local agency's belief that the state	State agencies have been observed to exert various forms of power	Critical mass refers to the		Technology-Organisation-Environment	Policy/legal framework and critical mass have no effect on electronic information

	and local governments	uncertainties about the legislative authority of the government agencies to collect and disseminate information.	the agency will perform actions that will result in positive outcomes for the local agency, and not perform actions in negative outcomes	(encouragement, recommendations, incentives, penalties, etc.) on local agencies to increase EIS.	number of agencies currently sharing or planning on sharing information electronically.		(TOE) framework with DOI and Critical Mass Theory to across Interorganizational, Questionnaire	sharing. Trust and power are supported factors in this study
Bigdeli, 2012	EIS among many local government authorities in the UK	The legal principles refer to the information sharing policies which can create an EIS environment in among departments to become effective and legitimate	Trust among the participating entities become an important matter.	Upper pressure refers to the influences of Central Government on decision-making processes of local authorities.			Typical Adoption Model with Factor Approach with Social Exchange Theory and Critical Mass Theory to share information among local government authorities, Interview	There is a set of legal information sharing, but with the lack of clarity and integrity among them has negative influences on EIS. There is strong inter-organisational leadership in LGAs‟ with positive attitudes and will towards inter-departmental information sharing. Trust factor has been the most important factor influencing the final decision. Critical mass has not been influencing the decisions of adopting EIS in LGAs.
Jing, Pengzhu & Yen, 2014	G2G information sharing among agencies in China	It refers to the rights of government agencies to collect and disseminate information, answering questions.	Inter-organizational trust is one of the fundamental conditions for establishing a partnership.	Information sharing can implement effectively when government agencies share a common upper-level leadership		Guanxi, refers to the result of social networks in China.	Layered Behavioral Model with DOI to across horizontal functional agencies, Questionnaire	Policy and trust have not influence effect, but upper-level leadership and GUAN XI have great influence in this study

3.3 Formulation of Hypotheses

This section presents the formulation of some hypotheses in relation to achieving the objectives of the study.

3.3.1 Benefits

Benefits pertain to the possible gains of electronically sharing information among organizations, such as less cost, highly accurate information, and reduced time (Yan, Sun, & Wang, 2009; Jing & Pengzhu, 2009). Studies indicate that the benefits of information sharing have an important part in a government organization within the government system (Frambach & Schillewaert, 2002; Yan *et al.,* 2009; Estevez *et al.,* 2010; Tie-nan *et al.,* 2010). Electronic information sharing helps the agencies achieve different kind of benefits, such as decreased cost, increased accuracy in collecting information, increased accuracy in timeliness, enhanced streamlining and management of operations, complete information to solve the problem, support for the current information, and advanced decision-making (Dawes 1996; Jing & Pengzhu, 2007a, 2009; Estevez *et al.,* 2010; Yang & Maxwell, 2011). Staff members in Iraqi public organizations have lacked a good understanding of the usefulness of government in electronic sharing information, which reduces the significance of increasing electronic information sharing in Iraqi government (Alwan& Abdurrahman, 2010; Ahmed, Jasem & Hassan, 2012). Moreover, electronic information sharing speed up and ease the process within increment in the accuracy of information. It also reduces, time, cost and corruption. Hence, it is hypothesized that:

H_1: *Benefit has a positive effect on electronic information sharing between Iraqi public universities and MOHESR.*

3.3.2 Risks

Similar to benefits, government organizations consider the risks relative to the projects of electronic participants (Yan, Sun, & Wang, 2009; He-Jiang, 2010). Risk refers to the peril of sharing electronic information among government agencies. Several huge risks of sharing information among agencies exist, such as making important information available to strangers (Estevez *et al.,* 2010). This reason prompts agencies to centralize the control of their information and knowledge. Information sharing may be against the official interest of managers or against their bureaucracy because information sharing decentralizes the agency power by making the information available to everyone in the agency (Jing & Pengzhu, 2009).

Government information is extremely sensitive; thus, electronically sharing information may create problems, such as violation of privacy rights (Dawes, 1996; Landsbergen & Wolken 2001; Akbulut, 2003; He-jiang, 2010; Estevez *et al.,* 2010; Yang & Wu, 2013). In many cases, information sharing systems have raised the issues of information theft and interruption because of the unfixable system of information sharing, and the design of the information sharing system may not be well written (Gil-Garcia & Pardo, 2005; Akbulut *et al.,* 2009; Yang & Maxwell, 2011). Moreover, as soon as the information is shared from one government database to another, protecting and controlling this information becomes difficult and expensive (Jing & Pengzhu, 2009). The risks are considered as the main factors for increasing information sharing among the Iraqi public organizations because government information is secured from threats and malicious acts, thus increasing the level of trust and confidence between these organizations (Alwan & Abdurrahman, 2010; Abdul-Alrahman, 2011; Salman, Abdul-Majeed & Ismaeel, 2012; Ahmed, Jasem & Hassan, 2012; Al-Shakarchy,

2013). Electronic information sharing will not cost a lot because higher education in Iraq has computers, software, and staff. Hence, it is hypothesized that:

H_2: *Risk has a negative effect on electronic information sharing between Iraqi public universities and MOHESR.*

3.3.3 Costs

The costs of electronic information sharing refer to the costs of obtaining the useful technology for sharing, including the system, installation, implementation, migration, integration, interface, training, maintenance, and communication costs (Landsbergen & Wolken, 2001; Akbulut, 2003; Jian & Pengzhu, 2007b, 2009). Government agencies typically lack electronic information sharing resources, thus causing difficulty in encouraging employees to share information (Estevez *et al.,* 2010). Information sharing with different agencies implies diverting the resources, which causes difficulty in sharing government databases. Thus, information sharing becomes extremely expensive (Dawes, 1996; Landsbergen & Wolken, 2001; He-jiang, 2010, Tie-nan *et al.,* 2010). Researchers have studied the impact of costs on electronic information sharing among agencies (Acbulut, 2003; Akbulut *et al.,* 2009; Kamal *et al.,* 2012; Bigdeli *et al.,* 2013). Finance is one of the largest issues in Iraqi agencies because the money that the agency obtains is inadequate in purchasing hardware and software to develop a real platform for increasing electronic information sharing (Abdul-Alrahman, 2011). There is no much risk in using electronic information sharing. Hence, it is hypothesized that:

H_3: *Cost has a negative effect on electronic information sharing between Iraqi public universities.*

3.3.4 IT Capability

IT capability pertains to the use of technological sources and experiences in government agencies to encourage employees to electronically share information (Jing & Pengzhu, 2009). In another word, IT capability refers to technological expertise and sources that should be available in government departments, hence helping them share information electronically (Kamal *et al.,* 2012). The lack of IT capability is considered as a significant barrier to information sharing among government agencies (Lee & Rao, 2007; Jing & Pengzhu, 2007a; Bigdeli *et al.,* 2012, 2013). Moreover, the sufficiency of IT tools in an agency is useful in adopting new technologies because different levels of IT capabilities in government agencies limit their information sharing (Gil-Garcia, *et al.,* 2007; Jing & Pengzhu, 2007b, 2009; Yang and Maxwell, 2011; Kamal *et al.,* 2012).

Agencies at the low level of government hierarchy can use basic IT capabilities, such as phones, disks, and faxes, or use the separate department of IT support (Heeks, 2006; Jing & Pengzhu, 2007b, 2009). The personal IT skill for government employees is a highly significant factor for adopting new technologies (Yang & Maxwell, 2011; Lu, Liu & Pie, 2011). If staff members of government agencies have inadequate experience and training, the training cost for any new technology subsequently decreases (Yang & Maxwell, 2011). Additionally, the lack of IT capability causes resistance to change, resistance to use and incapability to improve IT skills (Akbulut, 2003; Akbulut *et al.,* 2009; Lu, Liu & Pie, 2011). The IT skills of staff and availability software and hardware have influential effects in and within the Iraqi public organization. The increment of IT capabilities in the public organizations in Iraq increases electronic information sharing (Alwan & Abdurrahman, 2010; Mahmoud,

2010). Moreover, the lack of infrastructure and a huge gap in the IT skills between government agencies are evident (Ahmed, Jasem & Hassan, 2012). Public universities in Iran has enough computer but the need staff with good IT skills in order to fix the technical issues. Hence, it is hypothesized that:

H_4: *IT capability has a positive effect on electronic information sharing between Iraqi public universities and MOHESR.*

3.3.5 Information Quality

The quality of government services provided to the public enhances the relationship between government agencies and citizens and improves the efficiency of interactions (Prybutok, Zhang & Ryan, 2008). Government services aim to assist in building a better relationship between the government and its citizens. Gilbert, Balestrini, and Littleboy (2004) reveal that information quality is one of the factors that cause the success or failure of e-government. Information quality consists of several characteristics, such as timeliness, accuracy, credibility, and adequacy of information sharing (Xiao-rong & Sui-cheng, 2010). According to Klischewski and Scholl (2006), successful information sharing in inter-organizational collaboration strongly relies on the quality of the information. Recently, governments have started to pay more attention to information quality because a government decision can provide poor quality results if it is based on low information quality (Estevez *et al.,* 2010). In other words, any amount of information shared is useless without information quality. Sharing large amounts of government data and information by different systems and technologies with many agencies in several places can generate various issues, such as quality, consistency, security, completeness, and accuracy (Bigdeli *et al.,* 2011). Moreover, information quality has a substantial influence not only on the information

sharing of government agencies with citizens but also on the information sharing among the agencies because information quality can affect the trust between these agencies (Yang & Maxwell, 2011). Yang and Maxwell (2011) likewise emphasize that information quality increases the trust of the agency, which in turn, increases electronic information sharing. According to Yan, Sun, and Wang (2009), information quality factor affects the benefits of electronic information sharing. Decision makers in Iraqi public universities pay more attention to obtaining high-quality information because this approach allows them to make the best decisions (Muhii, 2009). Asim and Ibrahim (2013) indicate that decision makers in Iraqi public organizations require information quality in making decisions. Thus, Iraqi decision makers can obtain information quality by adopting information and communication technology, including the internet (Asim& Ibrahim, 2013). Information quality is very important, and public universities should share good quality information. Hence, it is hypothesized that:

H_5: *Information quality has a positive effect on electronic information sharing between Iraqi public universities and MOHESR.*

3.3.6 Compatibility

Compatibility refers to the capacity to provide equal levels of software, hardware, and skills in each government agency (Estevez *et al.,* 2010; Lu, Liu & Pei, 2011; Bigdeli *et al.,* 2012); it consists of organizational and technical compatibility. Organizational compatibility pertains to the compatibility in the skills of staff at every level of government that can help in electronic information sharing (Jing & Pengzhu, 2007b, 2009). It is considered as the organizational fit of the new system introduced. It also includes the impact of the new system on employee attitudes toward change, the

convenience of change, and power shifts, among others (Akbulut, 2003; Akbulut *et al.,* 2009; Jing & Pengzhu, 2009; Bigdeli *et al.,* 2013). Moreover, the projects implemented by government agencies require the interoperability of executive leadership to ensure success (Landsbergen & Wolken, 2001; Akbulut, 2003).

Technological compatibility refers to the unification of information technologies (software and hardware) required from the staff to electronically share government information (Akbulut, 2003). Many studies have indicated that the incompatibility of software, hardware, and telecommunication networks as well as having unskilled and inexperienced employees negatively affect the electronic information sharing among agencies (Dawes, 1996; Landsbergen & Wolken 2001; Jing & Pengzhu, 2007a; Estevez *et al.,* 2010; Yang & Maxwell, 2011; Bigdeli *et al.,* 2011, 2013). Abdul-Alrahman (2011) cited the incompatibility of software and hardware as one of the technical barriers and the incompatibility in staff skills and experiences as one of the organizational barriers in Iraqi public organizations. Therefore, the current study considers the effect of compatibility on the government in Iraq as a significant factor. It is important to have compatibility between MOHESR and public universities. There is not compatibility between MOHESR and public universities. Hence, it is hypothesized that:

H_6: *Compatibility has a positive effect on electronic information sharing between Iraqi public universities.*

3.3.7 Complexity

Complexity refers to the degree to which participation in electronic information sharing with organizations is perceived as a relatively difficult process (Akbulut *et al.,* 2009). There is complexity in ideas and/or processes of electronic information sharing. Moreover, technologies that used to adopt electronic information sharing might be difficult to implement and use. Ease of use is one of the important indicators of success information systems in public organizations (Newcomer and Caudle, 1991). Compared to non-sharing agencies, sharing agencies perceived the system to be easier to use and more user-friendly. Some public organizations decided to stop use information systems because of the complexity of these systems (Akbulut, 2003). Iraqi organizations require consideration of a number of technical issues . Thus they need to include a new change to their operational systems (E-Iraq, 2014). One of these issues is the complexity of data transformation to support the information sharing among government organizations' information systems (E-Iraq, 2014). Electronic information sharing is not complex; it is an easy process. Moreover, there is no real electronic information sharing project in between MOHESR and public universities. They still use the simple concept of sharing. Hence, it is hypothesized that:

H*$_7$: Complexity has a negative effect on electronic information sharing between Iraqi public universities and MOHESR.*

3.3.8 Data Warehouse

Data warehouse provides solutions for issues regarding electronic information sharing because the DW establishes a platform for achieving electronic information sharing (Cuiling, Tianhe& Guojun, 2006). The information sharing platform provides an environment of distribution and sharing, which recognizes data management, query

statistics, information publishing, user management, and system maintenance (Qi & Quan-hong, 2011). Government systems that rely on data warehousing techniques likewise enhance the effectiveness of huge government data increase information sharing, and support decision making (Huang, Dang, Cheng, Peng, & Zhu, 2010). The DW provides users with data availability. Furthermore, DW information is expected to be available for staff and accessible for dealers and clients (Connolly & Begg, 2010). Inmon (2005) stated that the most proper DW design ensures the quality of information, which increases user satisfaction, moderates the development, and decreases the cost of maintenance. Data warehousing tools are used for extracting clean data because any data quality issues should be solved prior to loading to the DW (Turban, Aronson, Liang, & Sharda, 2007). Moreover, data warehousing tools provide high-quality information (Turban *et al.,* 2007). The proper integration process, modeling data structure, and common storage that the DW provides add value to information sharing and knowledge among government agencies (Nimmagadda & Dreher, 2007; Huang *et al.,* 2010). Data warehouse (centralized information systems) can provide centralized types of information sharing by government organizations. Thus, by using centralized information sharing among government agencies, it can bring advantages such as better quality of information, simplified interaction, lower cost, and easier maintenance (Yang, Theresa Pardo & Wu, 2014).

Government systems in Iraqi departments are commonly operated with the support of isolated databases. According to Ahmed Jasem and Hassan (2012), Iraqi departments that belong to the same level should have a common database to foster information sharing and increase interaction. A common database likewise improves government efforts, thus improving government services (Ahmed *et al.,* 2012). According to

Hamad & Asman (2010), data warehouse can enhance the performance of the Iraqi universities, increase the interaction among them and improve the quality of inserted information. Thus, this study suggests DW to be one of the factors that can increase electronic information sharing between Iraqi public universities and MOHESR. Common storage such as data warehouse can increase electronic information sharing in Iraqi higher education sector. Therefore, in order to build the data warehouse they need IT staff, cost, hardware, software and a top manager. Hence, it is hypothesized that:

H_8: *Data warehouse has a positive effect on electronic information sharing between Iraqi public universities and MOHESR.*

3.3.9 Top Management Support

Top management support refers to the support of top managers that can create a better environment in which employees are encouraged to share information with other agencies (Kamal *et al.,* 2012). Researchers have stressed that without the support of top management, the progress of G2G information sharing slows down (Akbulut, 2003; Jing & Pengzhu, 2007b, 2009; Estevez *et al.,* 2010). Top management support provides guidance that can help organizations cross the barriers of information sharing (Akbulut *et al.,* 2009; Lu, Liu & Pei, 2011). It is exercised through leadership, authority, and involvement, thus further encouraging the staff to electronically share information (Gil-Garcia *et al.,* 2007). This kind of encouragement includes staff incentives, such as money and position (Yang & Maxwell, 2011). Alwan and Abdurrahman (2010) cite top management support as one of the important factors for the Iraqi public organization. Leadership is also necessary for encouraging the staff to participate and improve their skills and knowledge by sharing them with others.

Additionally, the Iraqi government system requires political leadership and strong management to support efforts to encourage the staff to become more creative (Fadhelalla, 2012). Everything belongs to the top manager in Iraq public universities so they should believe in electronic information sharing. Top manager in public universities can provide training to the staff. Moreover, the top manager can encourage the participants by letter of thanks or incentive. Hence, it is hypothesized that:

H_9: *Top management support has a positive effect on electronic information sharing between Iraqi public universities and MOHESR.*

3.3.10 Collaboration

Good network collaboration among organizations can increase and manage the delivery of public services (Gil-Garcia *et al.*, 2007), with information being shared efficiently. Collaboration is needed due to the differences of culture and commitment among participants. Moreover, it has been known as complex processes within a long time to achieve the objectives and goals of organizations (Pardo & Tayi, 2007). However, the willingness to share information happens when participants show their responses to other participants in other organization (Kamal, *et al.,* 2012).Thus, according to Thomas and Walport (2008), a general change should happen in the organizations especially in the public sector. This change aims to shift from the isolated environment into collaboration network. Information sharing needs anticipate reciprocity. Therefore, it is an important factor influencing organizational members' attitude to share their information (Bock, Zmud, Kim & Lee 2005). Iraqi government organizations need to increase the collaboration between them (Alwan & Abdulrahman, 2010). Moreover, this collaboration should not be only for information, but it should extend into visions, ideas, and investments. According to Alwan and

Abdulrahman (2010), information technology can be used to build a good collaboration between government organizations in Iraq. MOHESR should collaborate with public universities in order to build this project, but most of the responsibilities belong to the ministry. Hence, it is hypothesized that:

***H_{10}**: Good collaboration concept has a positive effect on electronic information sharing between Iraqi public universities and MOHESR.*

3.3.11 Size

Size refers to the effects of organization size on electronic information sharing (Akbulut, 2003). Some large organization uses electronic information sharing since a traffic records division was already in place, along with a workforce responsible for data entry and IT staff to support the initiative. Interestingly, an increase in size did not necessarily translate into electronic information sharing (Akbulut *et al.,* 2009). It also can be recognized through the size of the community served and the number of services provided (Akbulut *et al.*, 2009). Some large agencies viewed the initiative as a bottleneck to their operations because of the large volume of crash information that needed to be entered. Due to their heavy workload in other areas, they either chose not to share information electronically or were unable to enter information in a timely manner. Duties such as crime investigation and homeland security took priority. For smaller agencies, the case revealed that the resources needed to share information electronically were lacking. However, some small agencies, especially those with top supportive management, were found to be more innovative and willing to share information electronically (Bigdeli *et al.,* 2012). The size of the organization is an important factor in information government and the way in which organizations deal with their information for their activities (Bigdeli, 2012). Moreover, the greater

number of departments and employees in large organization increase the electronic information sharing participation. Therefore, this study suggests that the size of the university can affect the interaction and electronic information sharing with MOHESR. Big size universities can share more information electronically because they have more staff, students, and computers. Moreover, the big number of IT skills of stuff and computer can increase electronic information sharing. Hence, it is hypothesized that:

***H_{11}**: Large Size has a positive effect on electronic information sharing between Iraqi public universities and MOHESR.*

3.3.12 Policy/Legal Framework

The government policies can decrease or increase the encouragement of using electronic information sharing among its agencies; thus, it has a strong effect on electronic information sharing across agencies, especially in the public sector (Dawes, 1996; Landsbergen & Wolken, 2001; Gil-Garcia & Pardo, 2005; Gil-Garcia *et al.,* 2007). Jing and Pengzhu (2009) indicated that policy and law is one of the important factors in the electronic information sharing environment because the politicians may impose additional barriers if each government agency has different rules and standards on sharing e-information (Landsbergen & Wolken, 2001; Akbulut, 2003; Jing & Pengzhu, 2009; Bigdeli *et al.,* 2012). Researchers have pointed out that policy and legal framework can build relationships, reduce risks, and develop the trust between government agencies because the electronic information that can be shared between them is ascertained (Gil-Garcia & Pardo, 2005; Gil-Garcia *et al.,* 2007; Estevez *et al.,* 2010; Kamal *et al.,* 2012).

According to Abdul-Alrahman (2011), Iraqi government systems require new policies and laws to support agency employees because the policies and laws can increase authority and trust between the staff of agencies. Rules or laws that can protect the staff when they intend to share electronic information are inexistent (Alwan & Abdurrahman, 2010; Fadhelalla, 2012). The e-Iraq has included in its plan a strategy called "legal frames," which provides any individual in Iraq with the ability to securely share his/her information (E-Iraq, 2012). The Iraqi government has developed the Government Interoperability Framework (GIF), a standard document on sharing e-information among government agencies (GIF, 2011). Thus, the current study considers policies and laws as important factors that provide additional security for university staff members when they electronically share information. MOHESR needs to provide rules and laws because there is no rule can protect the employees while sharing their information electronically. Hence, it is hypothesized that:

H_{12}: *Policy/legal framework has a positive effect on electronic information sharing between Iraqi public universities and MOHESR.*

3.3.13 Interagency Trust

Interagency Trust refers to the belief that the information has been sent to the right agency and is deemed to be useful to the agency. Conversely, interagency trust pertains to the belief that the information has been received from the right agency and the information is correct (Akbulut, 2003; Akbulut *et al.,* 2009; Yang & Maxwell, 2011). The main outcome of trust between government agencies is the provision of an optimistic staff behavior (Akbulut, 2003; Gil-Garcia *et al.,* 2009; Bigdeli *et al.,* 2011, 2013). Information sharing causes difficulty in the interactions between participants because they may belong to different departments, hold different values, or operate in

divergent fields (Akbulut, 2003; Gil-Garcia *et al.,* 2007a; Akbulut *et al.,* 2009). Therefore, the leadership should recognize and protect the rights and interests of all the participants who can increase information sharing behavior (Akbulut, 2003; Jing & Pengzhu, 2009; Akbulut *et al.,* 2009).

Researchers have pointed out that the lack of trust between government agencies negatively affects electronic information sharing (Landsbergen & Wolken, 2001; Akbulut, 2003; Jing & Pengzhu, 2007b,2009; Bigdeli *et al.,* 2011; Yang & Maxwell, 2011). Trust is considered as one of the important factors; for instance, trust in Iraqi e-commerce positively affects the increase in trade exchange and information sharing among the dealers (Rashid, 2011; Ehsan, 2012; Al-Taie & Kadhim, 2013). Therefore, the Iraqi government should improve the trust among staff because trust is an important and essential factor among workers of public organizations (Abdul-Alrahman, 2011).

The present study suggests that trust agency factor affects electronic information sharing between the Iraqi public universities and MOHESR. There is trust among employees in MOHESR and public universities because the universities belong to the ministry, and also they are both are government sector (no competition between a public university and ministry). However, the trust between employees is not enough because it is based on the employees. Hence, it is hypothesized that:

H_{13}: *Interagency trust has a positive effect on electronic information sharing between Iraqi public universities and MOHESR.*

3.3.14 Upper-Level Leadership

Upper-level leadership refers to the capability of an external leadership to exert influence on its organizations to act in a prescribed manner (Akbulut *et al.,* 2009; Jing & Pengzhu, 2009). We observed the university exerted different kinds of power to increase electronic information sharing. Specific tactics included encouragement, recommendations, providing incentives, and imposing penalties. For example, in decentralization principle, the Ministry of Higher Education provide the universities with policies, standards, guidelines, coordination and others, where the Ministry of Higher Education sought universities feedback about general information, suggestions, ideas, objections, and others. The Ministry of Higher Education also supports universities, providing the necessary computer equipment at no cost, offering training and technical support, and assisting them in getting grants.However, upper-level leadership has the right to set rules and standards for sharing information, such as statewide inventories, data standards, data definitions and information. Moreover, Upper-level leadership assists to build trust environments between ministry and its universities. Moreover, leaders can clarify roles and responsibilities during the process of information sharing project. Finally, upper-level leadership supports electronic information sharing by providing financial resources and management to develop this project (Jing, Pengzhu& Yen 2013). By following the centralization principle in Iraqi public organizations for a long time that gives the external leadership an interactive effect on its organizations (Alwan & Abdulrahman, 2010; Ali, 2013). MOHESR has huge control on public universities. However, sometimes ministry gives orders and sometimes the request is enough. Moreover, MOHESR has a positive influence on public universities. Hence, it is hypothesized that:

H14: *Upper-level leadership has a positive effect on electronic information sharing between Iraqi public universities and MOHESR.*

3.3.15 Critical Mass

Critical mass refers to the organizations that are currently sharing or will share its information by using electronic information sharing project (Akbulut, 2003). Organizations are affected by the acts of similar organizations when they made decisions to use electronic information sharing (Bigdeli, 2012b). If the organizations are successfully sharing information electronically that can help to motivate non-sharing organizations (Akbulut, 2009). This study suggests that the high numbers of participant universities can give more encouragement to share information electronically with MOHESR. The number of universities that share the information electronically can encourage other universities to start share or share more of their information electronically. Moreover, the public universities in Iraq are willing to share their information electronically with MOHESR. Hence, it is hypothesized that:

H15*: Critical mass has a positive effect on electronic information sharing between Iraqi public universities and MOHESR.*

3.3.16 Social Network

Social network refers to personal relationships between inter-organizational (Jing & Pengzhu1, 2007a). It includes relationship, mutuality, long-term benefits, trust, favor, loyalty, concept of commitment and reciprocity (Shin, *et al.,* 2007; Jing & Pengzhu1, 2009). The good social network between inter-organizational can provide better trust environment and enhance the ability of cooperation in electronic information sharing (Jing & Pengzhu1, 2009). According to, Hatala *et al.* (2009) information sharing

across individual and inter-organizational boundaries is based on information sharing behaviors of the staff. Thus, the good social network can change staff's behavior from pessimistic into optimistic of sharing the information. Inter-organization social network is an important factor affecting organizational members' attitudes towards cooperating with partners, and it plays a crucial role in ensuring successful information sharing because it is a mutual obligation to respond to requests for assistance from others (Jing, Pengzhu & Yen, 2013). A staff behavior has influence effect in Iraqi organizations (Abdul-Alrahman, 2011). There is a corporate culture which bases on the idea of respect and mutual trust among all staff in Iraqi organizations (Al-Tak & Al-Hayali, 2013). Moreover, Iraqi organizations need to continue culturing their staff in order to increase their collaborations. There is normal and good relationship between MOHESR and public universities. The social network such as a relative, friends, mates and so on ca effect the sharing positively. Therefore, the social network can increase electronic information sharing because of the trust between them. Hence, it is hypothesized that:

***H16**: Social network has a positive effect on electronic information sharing between Iraqi public universities and MOHESR.*

Researchers typically attempt to determine the independent variables of the study and identify the effect of each independent variable on the dependent variables (Sekaran & Bougie, 2010). The theoretical model for this study; that is the theoretical model of electronic information sharing between Iraqi public ministries, and the MOHESR (Figure 3-2) consists of dependent (DV) and 16 independent variables (IV). The DV is the participation in electronic information sharing (DV) and16IVs are benefits,

risks, information quality, IT capability, costs, compatibility, complexity, data warehouse, top management support, collaboration, size, policy/legal framework, interagency trust, upper-level leadership, critical mass and social network. The related hypotheses for each factor are indicated in the figure.

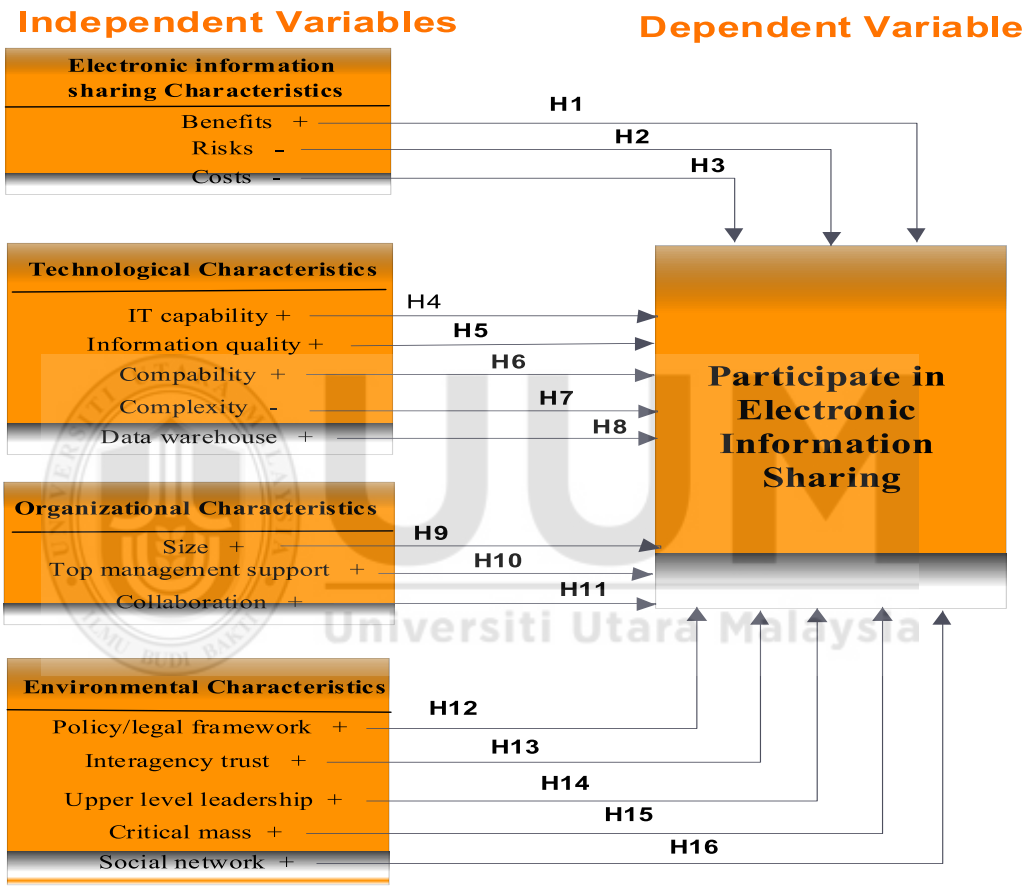

Figure 3.2. *Theoretical Model of Electronic Information Sharing between Iraqi Public Universities and MOHESR*

3.4 Conclusion

In this chapter, the theoretical model has been built by adding the influence factors inside each characteristic. It is also compared and hypothesized the factors of this study with the five previous studies. The hypothesis showed the positive and negative influence of each factor in order to increase the electronic information sharing between

public universities and the Ministry of Higher Education and Scientific Research in Iraq. Finally, this chapter presented the proposed theoretical model of electronic information sharing between the Iraqi public universities and the MOHESR, with the participation in electronic information sharing as the DV and 16 factors as the independent variables of this study. The next chapter will present the methodology applied in conducting this study.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 Introduction

Chapter Four describes the research process, quantitative research, data collection, questionnaire design, validity and reliability of the research, pilot study and data analysis method involved in this study. As stated in Chapter One, the research objectives and research questions are given as follows:

Research Questions

1. What are the barriers of electronic information sharing between Iraq public universities and MOHESR?
2. What are the factors that can increase the electronic information sharing between Iraq public universities and MOHESR?
3. How to guide the implementation of electronic information sharing between Iraq public universities and MOHESR?

Research Objective

The research is based on two main facts: first, the failure of adoption decentralization principle in Iraqi public universities (MOHESR, 2012); and second, the complex decision processes together with the limitation of electronic information sharing between public universities and Ministry of Higher Education and Scientific Research (Alhadithi, Idrus & Elameer, 2011; UNESCO, 2011; Al-Aqaby, 2012). Therefore this initiative electronic information sharing must be observed; hence the aim of this research is to

"Propose a model of electronic information sharing between Iraqi public universities and MOHESR."

Therefore, the main objectives of this study can be brief as follows:

1. To identify barriers of electronic information sharing between Iraqi public universities and MOHESR.
2. To identify factors that can increase the electronic information sharing between Iraqi public universities and MOHESR.
3. To propose a theoretical model of electronic information sharing between Iraqi public universities and MOHESR.

4.2 Research Process

This study consists of four phases to achieve its objectives.

The first phase involves a review the relative work in order to discover the barriers of electronic information sharing. Identified the barriers helped to find the factors of electronic information sharing. Therefore, in order to find out these barriers, the interview was made with the employee in MOHESR. The interview was done with Dr. Ghassan Nashat Mohammed from Computer Centre in MOHESR in Iraq (Ghassan Nashat Mohammed, 2016, July, 15). Moreover, the outcome of this phase was used to examine the research issues, to help in building the research problem, research questions, research objectives, importance of the study, and significance of the study, as well as identify the factors of electronic information sharing between Iraqi public universities and MOHESR. Additionally, this phase investigated the barriers of Iraqi public universities in order to increase electronic information sharing with MOHESR.

The barriers are Electronic information sharing, Technological, Organizational, and Environmental.

The second phase involves a review of the literature to support the process of analyzing previous studies on the issues, requirements, and significant factors of electronic information sharing. The outcome of the first phase helps identify the research gap of this study, thus assisting in building the research problem, research questions, research objectives, importance of the study, and significance of the study, as well as identify the factors of electronic information sharing between Iraqi public universities and MOHESR. This phase has identified the roles of Iraqi public universities in order to increase electronic information sharing with MOHESR.

The third phase involves designing the theoretical model using the significant factors that increase electronic information sharing between Iraqi public universities and MOHESR, as well as finds out the effect of data warehouse factor on electronic information sharing between them. Moreover, it is building the hypothesis for each factor in this theoretical model. The outcomes in this phase include the proposed theoretical model for increasing the electronic information sharing between Iraqi public universities and MOHESR. The design questionnaires, validity and reliability and sampling of the study are also discussed in the second phase. Data analysis relies on the survey in which data are obtained from the respondents to the questionnaires. Moreover, this analysis is used for evaluating the theoretical model of this study. Finally, after the evaluation, the theoretical model is the outcome of the study. The three phases are presented in Table4.1.

Table 4.1

Research Process

Phase	Objective	Input	Method	Output
Phase1	To identify the barriers of electronic information sharing between Iraqi public universities and MOHESR.	Previous studies of electronic information sharing, the frameworks, and models of electronic information sharing	Interview the administrative staff in MOHESR in order to discover the barriers of electronic information sharing in Iraqi higher education sector.	The barriers of electronic information sharing for the previous studies
Phase2	To identify factors to increase electronic information sharing between Iraqi public universities and MOHESR.	The barriers of electronic information sharing, previous studies of electronic information sharing, database, DW, higher education sector in Iraq and theoretical frameworks for electronic information sharing.	Analyze the literature reviews, compare the theoretical frameworks of electronic information sharing and define the influence factors of electronic information sharing.	Research problem, research questions, research objectives, the importance of study significant of study, the factors that increase electronic information sharing among Iraqi public universities.
	To propose an electronic	Research problem,	Design the theoretical model	The model of increasing the

Phase3	information sharing model for Iraqi public universities	research questions, research objectives, the importance of study significant of study, identify the factors for increase electronic information sharing among Iraqi public universities.	of to increase electronic information sharing between Iraqi public universities and MOHESR. Moreover, find out the effect of data warehouse factor in electronic information sharing between them. Finally, build the hypothesis for each factor in this theoretical model, questionnaires and sampling of study, data collection and analysis by using SPSS.	electronic information sharing between Iraqi public universities and MOHESR,

4.3 Quantitative Type of Research

There are two types of research methods, and depending on the types of data, they are called qualitative and quantitative research method. The qualitative type is discovering method used to describe the issue as real as possible (Saunders, Lewis, & Thornhill, 2011; Sekaran & Bougie 2010). The quantitative type includes statistical of data that

usually can be measured to find the knowledge (Saunders *et al.,* 2011; Sekaran & Bougie 2010). This research used a quantitative method to define and explain new variables that may be useful in developing a better model to increase electronic information sharing between Iraqi public universities. The quantitative research method has the ability to define the benefit of the population by generalizing the outcomes (Hair, Money, Samouel and Page 2007; Sekaran and Bougie 2010). Moreover, it is suitable to answer the research questions and also to achieve the main research objective of this study. The quantitative method can test hypotheses that have been generated from this model. The related data and information were gathered from other literature and previous research to confirm the hypothesis and also to guess the results. The questionnaire depends on a survey that leads to observing the association between the electronic information sharing characteristics, organizational characteristics, technological characteristics and environmental characteristics with the increment of electronic information sharing among Iraqi public universities.

4.4 Data Collection

The first section of this part discusses the survey technique that is used to describe the answers to research questions. The second section explains the sample and population of the study.

4.4.1 Survey

Survey is considered as the most general mode of data collection (Sekaran & Bougie, 2010) because it has usefulness and power to identify the proper answers for research questions (Hair *et al.,* 2007; Sekaran & Bougie, 2010). This study examined the factors of electronic information sharing among Iraqi public universities and MOHESR. Thus,

the survey is used in the current study because it is considered as a suitable and famous data collection technique. According to Hair *et al.* (2007), the most commonly used survey procedures are in-person telephone interviews, questionnaires, and interviews. Questionnaires are considered as an efficient mechanism for collecting data because they allow a researcher to exactly determine the requirements and measurements of variables (Sekaran & Bougie, 2010). Therefore, questionnaires are used in this study to achieve the second and third research objectives.

According to Sekaran and Bougie (2010), a survey is highly suitable if the data are collected from a large population. In this study, anyone who can share information with another person, in another university, is considered an information-sharing user. Thus, any member of the academic and administrative staff in each university can be considered a part of the population. Another reason for selecting the survey is its capacity to obtain information from a large sample of the population (Kumar, 2011).

An official letter has been sent from Iraqi cultural attaché in Malaysia to Ministry of Higher Education and Scientific Research in Iraq based on the supervisor letter and researcher request in order to get the acceptance of distributing the questionnaire in five public universities (APPENDIX D). After a long process and within more than two months- six official letters (5 for the universities and one for the researcher) have been collected by the researcher from the Mr. Maher Hasan Khadhim in Directorate of Scholarship and Cultural Relations in Iraq (APPENDIX E). Each letter has to be shown and submitted to each university by the researcher in order to let him distribute the questionnaire. The letter has been submitted to the department missions and public relations in each university. The department sent the official letter to the scientific

assistant of the president of the university in order to get the top manager sign. In each university there are two assistants of the president of the university one is for the scientific role and the second is for the legal role. Scientific assistant is the scientific deputy of President of the university. The department missions and public relations in each university did not allow the researcher to distribute the questionnaire by himself. Thus, the questionnaires have been given to the employees of missions and public relations department and they distributed them (APPENDIX F). However, the researcher requested from the department to distribute the questionnaire to the employees who share information electronically with MOHESR. Besides, the MOHESR official letter and scientific assistant of the university president have been attached with each questionnaire in order to encourage the employees to answer (APPENDIX G). The questionnaires have been collected around two weeks later by the researcher in each university.

4.4.2 Population and Sample

Sekaran and Bougie (2010) described population as a group of people, objects, or events of interest that a researcher desires to examine. In this study, the population comprises of 22 Iraqi public universities. According to Creswell (2009) and, Sekaran and Bougie (2010) the time, cost and willingness of the participant are the most important criteria for any researcher to identify his\her scope. Thus, the reference population comprises of five universities in five states in the Middle Euphrates region, namely, University of Al-Kufa, University of Karbala, University of Babylon, University of Al-Qadisiyah, and University of Al-Muthanna (MOHE, 2013).

The selections of these universities are based on a few reasons. From one perspective for instance on the research are, many studies in several scientific fields have used the middle region of Iraq as a sample of their data collection (Al-Musawi & Maky, 2005; Matab & Dhahr, 2006; Al-Issawi & Ahmed, 2008; Khamees, 2010, 2011, 2012; Al-Jubory, 2012; Al-Dalimy, Emirate, Al-Asadi, 2012; Al-Ubaidy, 2012; Al-Yassry, Al-Khfaji, & Husain, 2012; Al-Yassry & Husain, 2012). The previous studies of Al-Yassry, Al-Khfaji, & Husain (2012), Al-Dhalmy, Al-Amarah, Afinan, and Al-Asadi (2012) have supported that these five universities in the middle region of Iraq have an important role in building the society, have good communication and collaboration, and focused on research and scientific studies. On the politics and the security perspective, the situations in the states of these universities are considered safer and more stable compared to the others.

Hair *et al.* (2007) described the sample as a small subset of the population that can raise the results on the population characteristics. The sampling frame of this study consists of the administrator staff of the chancellery office of each university in these five universities. A total of 660 questionnaires has been distributed. The reason for this selection is based on people who have direct interaction with MOHESR when dealing with any university's information. Sampling is the method of selecting a satisfactory number of elements from the target population (Sekaran & Bougie, 2010). The sampling method used in the current study is non-probability sampling. The selection of elements for the sample is purposive; therefore, the sampling method is purposive sampling (judgment sampling). Sekaran and Bougie (2010) cited several reasons for selecting the sampling.

- It is almost difficult to collect data on every element if survey involved few hundreds of elements. Even if it is possible, it would be expensive and waste of effort and time.
- The best reliable accuracy is when data is collected in a limited amount because it reduces fatigues, which creates less error.

A total of 660 questionnaires has been distributed. However the final number of respondent was 274. (APPENDIX H).

4.4.3 Power Analysis and Required Sample Size

There is a direct effect of the sample size that is utilized in the multiple regressions to the statistical power of significance testing and the generalizability of the results (Hair Ringle & Sarstedt, 2013). Sample size can be calculated by the researcher in order to identify the correlation of independent variables with dependent variables for some types of statistical tests and quantity of independent variables, provided the estimated effect size, the α level, and the power desired (Ferguson and Ketchen 1999, Hair *et al.*, 2013).

Table 4.2 below displays the sample size required in multiple regression analysis for effect sizes that are provided and a number of independent variables at a power level of 0.80 and α level of 0.05. The table is made by making use of the G*Power, which is a general power analysis program that executes analysis with great accuracy statistical power for the most frequent statistical tests (Faul and Erdfelder 1992).

Table 4-2.

Sample Size Required for G. Power (Akbulut, 2003; Faul and Erdfelder 1992*).*

Independent Factors	Effect Size Small=0.02	Effect Size Medium=0.15	Effect Size Large=0.35
4	602	85	40
5	647	92	43
6	688	98	46
7	725	103	49
8	759	109	52
9	791	114	54
10	822	118	57
11	850	123	59
12	878	127	61
13	904	131	64
14	929	135	66
15	954	139	68
16	977	143	70

According to the previous justifications, in order to attain adequate statistical power for the multiple regressions of the seventeen independent variables, at least 70 participants must acquire 80% power for bigger effects (Faul and Erdfelder 1992; Faul, Erdfelder, Lang & Buchner, 2007). Consequently, the smallest sample size needed for this study is 70 respondents. Moreover, according to Hair, *et al.,* (2013), the sample size is a number of variable multi 10 times. As the total numbers of used responses were 262, the sample size requirement is satisfied for the multiple regression analysis.

4.5 Questionnaire Design

A questionnaire is considered as the main technique of data collection in this study because the questionnaire is an efficient mechanism for collecting data. Based on Sekaran and Bougie (2010), the design of the questionnaires for this study relies on three criteria; the manner of writing the questions, planning for the classification of variables, and appearance of the questionnaire. The questionnaires consist of six parts:

- Part 1- a set of questions related to demographic factors

- Part 2 - a set of questions related to the readiness for electronic information sharing
- Part 3 - a set of questions about the characteristics of electronic information sharing
- Part 4 - a set of questions about agency characteristics
- Part 5 - a set of questions related to technological characteristics
- Part 6 - a set of questions related to environmental characteristics. See Figure 4-1.

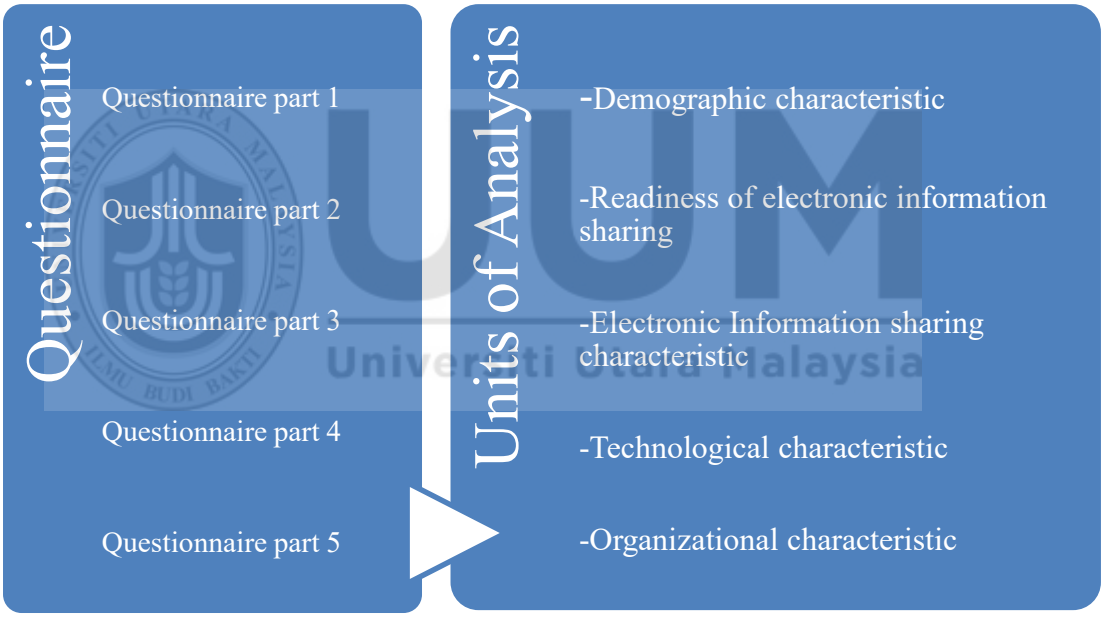

Figure 4.1. The Groups of Questionnaires and the Units of Analysis.

Electronic information sharing inventory (Akbulut, 2003, 2011; Bigdeli, 2012; Jing, Pengzhu & Yen, 2013) has been applied for the current study and was modified. Therefore, face to face, content, and construct validity have been done in order to check the validity of these items. Additionally, in order to do the reliability, a pilot study was conducted. Table 4.3 shows the items of each factor and their resources.

The dependent variable in this study has been measured in Part Two in questions 2, 3, 4 and 5. Moreover, the dependent variable questions have been adapted from studies of Akbulut (2003) and Al-Khasawneh's (2012). The questionnaires were written in English and later translated into Arabic because Arabic is the official language in Iraq. (APPENDIX I).

Table 4.3:

Constructs, Items and its references

Constructs	Items	References
Benefits	Part 3, Items 1-9	Jing & Pengzhu (2009), Akbulut (2011), Bigdeli (2012)
Risks	Part 3, Items 10-14	Jing & Pengzhu (2009), Akbulut (2011), Bigdeli (2012)
Costs	Part 3 , Items 15-18	Jing & Pengzhu (2009), Akbulut (2011), Bigdeli, (2012)
IT capability	Part 4, Items 1-4	Landsbergen & Wolken (2001), Akbulut (2003), Jing & Pengzhu (2009), Bigdeli, (2012)
Information quality	Part 4, Items 5-8	Bigdeli (2012)
Compatibility	Part 4, Items 9-11	Jing & Pengzhu (2009), Akbulut (2011), Bigdeli, (2012)
Complexity	Part 4, Items 12-13	Akbulut (2011)
Data warehouse	Part 4, Items 14-17	Ariyachandra & Watson (2010), Lu, Liu & Pei (2011)
Top management support	Part 5, Items 1-4	Jing & Pengzhu (2009), Akbulut (2011), Bigdeli, (2012)
Collaboration concept	Part 5, Items 5-7	Bigdeli (2012)
Size	Part 5, Items 8-10	Akbulut (2011), Bigdeli (2012)
Policy/Legal framework	Part 6, Items 1-3	Jing & Pengzhu (2009), Akbulut

			(2011), Bigdeli, (2012)
Interagency Trust		Part 6, Items 4-7	Jing & Pengzhu (2009), Akbulut (2011), Bigdeli, (2012)
Upper level leadership		Part 6, Items 8-11	Akbulut (2011), Bigdeli, (2012)
Critical Mass		Part 6, Items 12-15	Akbulut (2011), Bigdeli, (2012)
Social Network		Part 6, Items 16-18	Jing & Pengzhu (2007, 2009), Jing, Pengzhu & Yen (2013)
Participation		Part 2,question2,3,4 & 5	Akbulut (2003), Al-Khasawneh (2012)

4.5.1 Reliability of Questionnaire

According to Sekaran and Bougie (2010), "the reliability of a measure indicates the extent to which it is without bias (error free) and hence ensures consistent measurement across time and across the various items in the instrument." Therefore, a research instrument that is consistent, stable and predictable is considered to be reliable. The higher level of consistency and stability in the research instrument, the higher its reliability (Kumar, 2011). The reliability of the research may be determined through two procedures; internal and external consistency procedures (Kumar, 2011).

This study followed the internal consistency procedures because it needs to measure the questions of the same phenomenon by hanging the result of answers that attached from the respondents together as a group (Kumar, 2011).The examination of the internal consistency measures conducted via two modes, namely, inter-item consistency reliability and split-half reliability (Sekaran & Bougie, 2010). According to Sekaran and Bougie (2010), "the inter-item consistency reliability is a test of respondents' answers to all the items in a measure." The most common test of this measure is Cronbach's alpha (Cronbach, 1946; Sekaran & Bougie, 2010). The

Cronbach's alpha test has values ranging from 0 to 1; a higher level of range implies a greater value of reliability. Values of 0.8 and above indicate that the reliability of the research instrument is good; values above 0.6 also signify an acceptable reliability (Hair *et al.,* 2007). Moreover, Zuriani (2011) explained that values ranging from 0.5 to 0.6 are slightly acceptable for the reliability of research in the context of new applications or situations.

To increase the value of questionnaire reliability up to 0.74, Kumar (2011), suggested that the researcher should follow certain steps, such as increasing the number of items, standardizing the administration procedures, ensuring that the respondents wisely mark items in the questionnaire, and ensuring that the items in the questionnaire convey a clear idea, are well written, and fit for the respondents. The inter-item consistency reliability was selected for this study to test the respondents' answers for all the items using Cronbach's alpha.

4.5.2 Validity of Questionnaire

Validity is used in ensuring the collection of high-quality data. Thus, validity pertains to the capacity of a tool to measure what it is supposed to measure (Kumar, 2011). According to Sekaran and Boungie (2010), validity is defined as the degree to which the researcher has measured what he has set out to measure. However, validation has several types, such as face and content validity, concurrent and predictive validity, and constructs validity (Kumar, 2011).

Validity test is achieved through content, face, and validity. Content validity implies that the measurement instrument should be drawn from the items (Sekaran & Bougi,

2010). Moreover, content validity should be reviewed by experts from a similar field to ensure that the instrument has content validity. Therefore, the measurement instrument of this study was extracted from the content and subsequently judged by a panel of experts in the field of electronic information sharing. Face validity means the instrument apparently measures what it is supposed to measure (Sekaran & Bougi, 2010). Thus, the instrument was designed with the supervisor, colleagues, and panel of experts. Their opinions were adopted to build and consider the questionnaire that is written in English and Arabic.

4.6 Pilot Study

This section presents the pilot study of every variable. A pilot study is a small scaled version of a study, used to test the validity of experimental procedures and measures (Kenneth & Bordens, 2005). One of the objectives of conducting the pilot study is to check the reliability and validity of the instrument. In the first pilot study, the questionnaires have been distributed among Iraqi students who are studying Ph.D. and master at Universiti Utara Malaysia (UUM), Universiti Technology Malaysia (UTeM) and Universiti Kebangsaan Malaysia (UKM). The participants were chosen on the basis of their administrative experience in Iraqi public universities. In addition, more than a hundred emails were sent to members of the administrative staff in Iraqi public universities. However, only 35 questionnaires were collected, five of which have not been answered correctly. Thus, the total number of correctly answered questionnaires is 30. The result of the pilot study showed that Cronbach Alpha values of three factors were less than 0.7. These three factors, namely, IT capability, data warehouse, and policy/legal framework, have values of 0.634, 0.563, and 0.537, respectively. In order to improve the reliability of questionnaire a slight modification based on the

respondents' comments and experts in the related area has been conducted. Therefore, the second pilot study was performed.

In the second pilot study, questionnaires were distributed to Iraqi students who were studying doctoral and master's degrees in Malaysian universities and who had administrative experience in one of the Iraqi public universities. The assistance of the Iraqi Cultural Attaché in Malaysia was obtained to find students who qualified. Moreover, several emails were sent to the administrative staff from some of the Iraqi public universities. However, among the 35 questionnaires that were collected, five were not correctly answered. Table 4.4 illustrates the demography result of the two pilot studies. The data collected from the pilot study have been analyzed by using SPSS 20 to know the values of each factor in Cronbach's alpha.

Table 4.4

Demographic Result of Pilot Study

Variable	No. of participants		% of participants	
	Pilot study 1	Pilot study 2	Pilot study 1	Pilot study 2
Gender				
Male	21	24	70.0%	80.0%
Female	9	6	30.0%	% 20.0%
Age				
Less than 30	6	3	20.0%	10.0%
From 30 to 40	20	21	66.7%	70.0%
From 41 to 50	3	5	10.0%	16.7%
More than 50	1	1	3.3%	3.3%
Education				
Bachelor	8	5	26.7%	16.7%
Master	20	22	66.7%	73.3%
PhD	2	3	6.7%	10.0%
Years of Experience				
From 1 to 5	12	6	40.0%	20.0%
From 6 to 10	15	14	50.0%	46.7%
From 11 to 15	2	8	6.7%	26.7%
More than 15	1	2	3.3%	6.7%
Type of Position				
Administrator	12	10	40.0%	33.3%
Administrator and Academic	18	20	60.0%	66.7%
Name of Office, Department and Centre				
President office	1	1	3.3%	3.3%
Research and development	**7**	2	23.3%	6.7%

Student Affairs	2	2	6.7%	6.7%
Studies, planning and follow-up	3	1	10.0%	3.3%
Continuing Education	3	3	10.0%	10.0%
Ratifications and documents	0	1	0.0%	3.3%
Scholarship and Cultural Relations	3	1	10.0%	3.3%
Finance Affairs	0	0	0.0%	0.0%
Public Relations and Media	2	0	6.7%	0.0%
Physical Education	0	0	0.0%	0.0%
Engineering Affairs	2	6	6.7%	20.0%
Legal Affairs	2	2	6.7%	6.7%
Audit	0	0	0.0%	0.0%
Quality	1	0	3.3%	0.0%
General Secretariat of the library	0	0	0.0%	0.0%
Directorate dormitories	0	0	0.0%	0.0%
Studies	2	2	6.7%	6.7%
The development of teaching and training of university	0	3	0.0%	10.0%
TOEFL	0	0	0.0%	0.0%
Research and training campus	0	0	0.0%	0.0%
Information technology	1	3	3.3%	10.0%
Statistic and information	1	1	3.3%	3.3%
Architecture	0	1	0.0%	3.3%
Coordinator	0	1	0.0%	3.3%
Electronic Eng.	0	3	0.0%	10.0%
Elect. network	0	1	0.0%	3.3%
Import	0	1	0.0%	3.3%
Mechanical Eng.	0	1	0.0%	3.3%
Level of Position				
Top manager	1	1	3.3%	3.3%
Manager	1	5	3.3%	16.7%
Responsible	14	8	46.7%	26.7%
Employee 14 16 46.7% 53.3%	14	16	46.7%	53.3%

Some suggestions from the participants have been considered to improve the questionnaire items. Many changes in some of the items of the second pilot study have been done to make the questionnaire clearer and easier to understand by rewriting them again. Moreover, the items of factors have been reduced (Benefits, Compatibility, Complexity and Upper-Level Leadership) because of the repetition and modifications of the questions. All the factors have values more than 0.7 which are acceptable. Table 4.5 shows the Cronbach's alpha and a number of items for each factor.

Table 4.5
Cronbach's Alpha and no. of items

Factor name	Cronbach's Alpha		N of Items	
	Pilot study 1	Pilot study 2	Pilot study 1	Pilot study 2

Benefits	.765	.889	13	9
Risks	.942	.786	5	5
Costs	.927	.939	4	4
IT Capability	.634	.740	4	4
Information Quality	.908	.766	4	4
Compatibility	.825	.715	5	3
Complexity	.870	.916	3	2
Data warehouse	.563	.961	4	4
Top management support	.900	.896	4	4
Collaboration	.715	.719	3	3
Size	.742	.748	3	3
Policy/ Legal framework	.537	.914	4	3
Interagency trust	.880	.788	4	4
Upper Level Leadership	.875	.795	5	4
Critical Mass	.840	.790	4	4
Social Network	.863	.730	3	3

4.7 Data Analysis

This paper aims to identify the significant factors of e-government systems that influence the increase in electronic information sharing between Iraqi public universities and MOHESR. The major analytical tests describe the analysis and parametric test of each factor. This test consists of several types of analysis, such as cross tabulation, regression, and correlation analysis, which are used to achieve the objectives of this study. Chapter five discusses the details of the test and results of data analysis for every analysis unit. This analysis is performed using SPSS version 20.

4.7.1 Convergent and Discriminant Validity

In order to claim the validity of an instrument, it is necessary to have both convergent and discriminant validity (Trochim, 2008). Convergent validity refers to the state when items measure their intended construct and no other construct, whereas discriminant validity is confirmed when the construct as a whole differs from the other constructs (Straub, Boudreau, & Gefen, 2004).

Two kinds of approaches can be used to get the validity of an item named, classical approach and contemporary approach (Bagozzi, Yi & Phillips, 1991). Classical consists of multitrait-multimethod technique (MTMM) (Campbell, 1986) or principal components factor analysis (Straub, Boudreau, & Gefen, 2004), whereas the contemporary consists of confirmatory factor analysis utilizing maximum likelihood extraction as structural equation modeling (SEM). In fact, in the recent time, the use of structural equation modeling techniques for validating and test the item has become popular in the system information area. In order to use this technique large sample size is required. According to Hair, *et al.,* (2007), in order to precede factor analysis a sample should be more than 100. Moreover, according to Pallant (2013), a sample size for factor analysis need to 150 or more. Thus, based on a number of variables in the theoretical model and the size of the sample the classical approach is mostly used to validate the item.Therefore, the "principal components factor analysis" was adopted in order to measure and test the item validation. Factor analysis is a multivariate statistical technique which uses to analyze the correlations structure amongst the large number of factors (Hair, Tatham, Anderson & Black, 2006). Moreover, it is depended on a number of common dimensions. Thus, factor analysis can assist the researcher to find out if a certain number of instruments do or do not constitute a construct (Straub, Boudreau, & Gefen, 2004). Factor analysis has two important features,

1. separate structure dimensions are identified, extended and explained based on each factor by each dimension, and
2. The set of factors is decreased by the summarizing and reducing data (Hair *et al.,* 2006).

In order to test the validity of the item, the Varimax with Kaiser normalization rotation technique of principal component factor analysis was using by SPSS package. According to Pallant, (2013) there are two rotation methods named, orthogonal and oblique, one of them should be chosen bases on requirements of the research problem. Researchers can apply both rotations (orthogonal and oblique) then they choose the easiest and clearest in order to interpret in the research (Pallant, 2013). Therefore, this research uses an orthogonal rotation method with varimax (the most common in orthogonal approach) rotation because the variables are not supposed to be completely related (they are independent). Moreover, the results were clearer and easier to interpret.

Discriminant validity refers to a specific variable (construct) that is truly distinct from other variables (constructs) (Hair, *et al.,* 2007). The discriminant validity test is carried out when exogenous constructs have a large correlation. The discriminant validity was carried out anyway by calculating Average Variance Extracted (AVE) for each pair of constructs and comparing its value with the square of the correlation between such constructs.

A comparison between the average variance extracted (AVE) values respective to each factor in order to correlate among factors to provide discriminant validity (Staples *et al.,* 2004). According to Gefen, Straub and Boudrea (2000), average variance extracted refers to "measures the percentage of variance captured by a construct by showing the ratio of the sum of the variance captured by the construct and its measurement variance" (Gefen, Straub & Boudrea, 2000, p. 66); the following equation is used to determine the AVE:

$$AVE = \frac{\sum \lambda i2}{\sum \lambda i2 + \sum (1 - \lambda i2)}$$

A specific instrument that calculates the factor having the factor loading is characterized as λi.

4.8 Conclusion

This chapter describes the research process which consists four phases. The quantitative type of research has been mentioned. The distributing questionnaire was the method that used to collect the data of this research. The questionnaire has been designed based on six parts namely; demographic characteristic, states of electronic information sharing, electronic Information sharing characteristic, technological characteristic, organizational characteristic, and environmental characteristics.Validity and reliability of the research have been checked by applying two pilot studies. Finally, data analysis method has been involved in this study by using SPSS version 20.

CHAPTER FIVE

DATA ANALYSIS

5.1 Introduction

This chapter provides a comprehensive discussion of the data analysis performed in the study and the results obtained in order to evaluate the model. It starts with the discussion on the survey response, followed with the respondents' profile, the state of electronic information sharing, the validity and reliability resorts, and finally the results of the hypothesis.

5.2 Survey Response

This section reported the results of the survey comprises of response rate, missing data and screening data, normality and, Kaiser-Mayer-Olkin and Bartlett's test.

5.2.1 Response Rate

The sampling frame for this study consisted of the chancellery office of five public universities in Iraq. The size of the sample is 660 and from this, only 274 (42%) of the questionnaires have been returned. Of the 274 returned questionnaires, 12 of them

were incomplete or giving random answers, thus, were dropped from subsequent analyses, yielding 262 usable (40%).

5.2.2 Missing Data and Screening Data

Missing data refers to the not available data for a subject or case (empty answer) in the questionnaire (Hair, *et al.* 2007). It is caused by the respondent's refusal or forgot to answer one or more questions. Therefore, the questionnaire has included direction how to answer the questionnaires in order to decrease the missing data. To check the error, the study needs to look for the values those falls out the range of right values for the items (Pallant, 2013). It is important to check the errors before starting the analysis because these errors can distort the result. In order to check the errors, frequency analysis has been done for each item. Therefore, the data has been screened and cleaned before analyzed. A few participants have more than 5 missing values that were excluded from analysis in order to get quality analysis result.

5.2.3 Normality and Outliers

The normality checking has been conducted in this study in order to make data normal for analysis. As indicated in Table 5.1, there is no value exceeding the acceptable range of normality (Skewness) as suggested by Hair *et al.,* (2013), which is between -1.96 and +1.96 at 0.05 significance level. As for kurtosis, the normal range of outlier is between -3 and +3. Based on the kurtosis and skewness results, there is no serious concern about the normality distribution of the data, so they are sufficient to be used for further analysis. Moreover, according to Hair *et al.* (2013), the curves of factors are normal (APPENDIX J).

Table 5.1.

Descriptive Statistics of normality (Skewness and Kurtosis)

	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Ben	262	3.5017	.51391	.255	.150	.370	.300
Risk	262	2.6023	.69536	-.208	.150	.430	.300
Cost	262	3.3454	1.18962	-.248	.150	-1.494	.300
ITcap	262	2.8836	.98786	.004	.150	-.670	.300
IQ	262	3.5248	.88860	.069	.150	-1.002	.300
Compat	262	3.3295	1.03143	-.066	.150	-1.261	.300
Complix	262	3.1164	1.25747	-.114	.150	-1.073	.300
DW	262	3.2271	.74789	.143	.150	-.810	.300
TMS	262	3.1546	.92458	-.010	.150	-.882	.300
CC	262	3.5789	.92384	-.271	.150	-.767	.300
Size	262	2.9389	.97286	.244	.150	-.587	.300
Policy	262	3.2430	1.00271	.017	.150	-.859	.300
Trust	262	3.2948	1.25359	-.235	.150	-1.676	.300
Upper	262	3.2510	.90430	-.143	.150	-.693	.300
Mass	262	3.1450	.90996	-.119	.150	-.446	.300
Network	262	3.4924	.91703	-.293	.150	-.572	.300
DV	262	3.2019	.71789	.232	.150	-1.282	.300

Ben: Benefits, Risk: Risks, Cost: Costs, ITcap: IT capability, IQ: Information quality, Compat: Compatibility, Complix: Complexity, DW: Data warehouse, TMS: Top management support, CC: concept collaboration, Size: Large size, Policy: Policy/legal framework, Trust: interagency trust, Upper: Upper level leadership, Mass: Critical Mass, Network: Social network, DV: Dependent variable.

This research also checked for Outliers. According to Zikmund (2003), the outlier is referred to the data that has value lying out the normal range of dataset. Moreover, Coakes and Steed (2003) identified the Outliers as "*extreme cases which have a considerable impact on the regression solution*." Therefore, the technique that utilized in order to check the outliers of the data in each variable was the Z-score. The data is an outlier when the Z-score value more than +3 or less than -3 (Coakes & Steed, 2003). The Risk variable is having two outliers Thus, to explore how these cases affect the result, a comparison was made between the original mean for a particular variable and

the 5% trimmed mean (the new mean calculated after the top and bottom 5 percent of cases are removed from the distribution). According to Pallant (2013) "*If the trimmed mean and mean value are very different, you may need to investigate these data points further*." When this research compared the original mean (2.6023) and the 5% trimmed mean (2.6145) for Risk variable, it found that both values are mostly similar. From the outliers result, the obtained data of variable were valid and suitable for factor analysis. (APPENDIX K).

5.2.4 Kaiser-Mayer-Olkin and Bartlett's Test

In order to be sure that the independent variables have the significant corrections with the dependent variable, the factor analysis should be applied (Hair *et al.,* 2010). The Kaiser- Mayer Olkin's Measure of Sampling Adequacy (MSA) test and Bartlett's Test of Sphericity have been used to find the suitability of the research data to the factor analysis. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy is a statistic utilized to identify the percentage of variance of the research's variables. Moreover, the index range of Kaiser-Mayer Olkin's Measure of Sampling Adequacy (MSA) is from 0 to 1, so the measurements as follow:

1. If the percentage is 1 that means each variable is perfectly predicted without error by the other variables.
2. If the percentage is .90 or above that means marvelous,
3. If the percentage is .80 or above that means meritorious,
4. If the percentage is .70 or above that means middling,
5. If the percentage is .60 or above that means mediocre,
6. If the percentage is .50 or above that means miserable and,
7. If the percentage is below (.50) that means unacceptable.

This study has used The Kaiser- Mayer Olkin's Measure of Sampling Adequacy (MSA) test and Bartlett's Test of Sphericity in order to find the suitability data for factor analysis. The Kaiser-Mayer Olkin's Measure of Sampling Adequacy (MSA) for this study was found to 0.700, which is considered middling. That means the data are ready to be factor analysed.

The Bartlett test of Sphericity is used in this study in order to find the significant correlations among of the research variables. Moreover, it refers to correlation of variables if they are related or unrelated. In order to find the significance level of the test, the result of value should be less than 0.05. However, the level of significance for the Bartlett's Test of Sphericity was0.000, which means the data are suitable for factor analysis test. Thus, the results of Kaiser-Mayer Olkin's Measure of Sampling Adequacy (MSA) and Bartlett tests illustrate that the data meet the fundamental requirements for factor analysis. Table 5-2 shows the results of these tests.

Table 5.2
KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.667
Bartlett's Test of Sphericity	Approx. Chi-Square	10540.173
	df	1953
	Sig.	.000

5.3Respondents' Profile

The majority of the participants are males (62.2%) where most of the participants (41.1%) are between 31 and 40 years old. The rest are less than 30 years old (21%), 41 to 50 years old (29%), and above 50 (9.9%). The level of education for the participants is diploma (1.9%), bachelor (58%), high diploma (4.2), master (22.9%) and Ph.D. (13%).

The working experience of participants has different frequencies such as from 1 to 5 years (29%), from 6 to 10 years (31.3%), from 11 to 15 years (20.2%) and 19.5% goes to more than 15 years. There are two types of positions of the participants; administrator and, administrator and academic 59.2% and 40.8% respectively. In terms of the position level, four levels of the position of the participant are an employee, responsible division officer, manager and top manager (49.2%), (21%), (29.8%), (0%) respectively. Moreover, Table 5.3 shows the names of office, department and center in these five universities (For more information about respondent profile please refers to APPENDIX L).

Table 5.3
Name of offices, departments, and centers

	Frequency	Percent
President Office	6	2.3
Research and development	20	7.6
Student Affairs	10	3.8
Studies, planning, and follow-up	13	5.0
Continuing Education	14	5.3
Ratifications and documents	8	3.1
Scholarship and Cultural Relations	16	6.1
Finance Affairs	16	6.1
Public Relations and Media	14	5.3

Physical Education	4	1.5
Engineering Affairs	13	5.0
Legal Affairs	12	4.6
Audit	12	4.6
Quality	12	4.6
General Secretariat of the library	5	1.9
Directorate dormitories	7	2.7
Studies	8	3.1
The development of teaching and training of University	7	2.7
TOEFL	10	3.8
Research and training campus	8	3.1
Administrative Affairs	16	6.1
Computer	3	1.1
Desert Studies	1	.4
Employment Service	4	1.5
Environmental Research Center	5	1.9
Government Contracts	5	1.9
Human resources	4	1.5
Maintenance	4	1.5
Monitoring and Internal Audit	1	.4
Promotions	3	1.1
University website	1	.4
Total	262	100.0

5.4State of Electronic Information Sharing

This section refers to the state of electronic information sharing between public universities and ministry of higher education and scientific research.

5.4.1Use of Electronic Devices

This study tried to discover the electronic devices used such as line or mobile, email, website, webcam and access to the ministry database in which participants use to share information.

- **Line and Mobile**

The study showed that about 4.2% of the participants have never used line and mobile phone, 14.9% have used line and mobile phone once in a year, 19.8% have used line and mobile phone one time in a month, 46.6% a few times in a month, and 14.5% a few times in a week.

- **E-Mail**

In terms of email usage for information sharing, 3.4% of participants have never used an email at all. About 14.1% of them have used email once in a year, 29.0% have used one time in a month, 40.1% of participants have used email a few times in a month, and 13.4% of participants have used email a few times in a week.

- **Website**

The participants answers were 2.7% of them have never use website, 11.8% of participants have used it only once in a year, 33.2% of participants have used website one time in a month, 37.4% of participants have used website few times in a month, and using the website only few times in a week were the answers of 14.9% of participants.

- **Webcam**

Regarding the use of webcam, about 9.2% of participants have never used webcam, 10.7% of participants have used webcam once in a year, 36.3% of participants have used webcam one time in a month, 24.8% of participants have use webcam few times in a month, and 19.1% of participants have used webcam few times in a week. Finally,

all the participants agreed that they never accessed the database of the MOHESR to get the required information. Figure 5.1 illustrates the percentage of using the electronic devices for information sharing between universities and MOHESR.

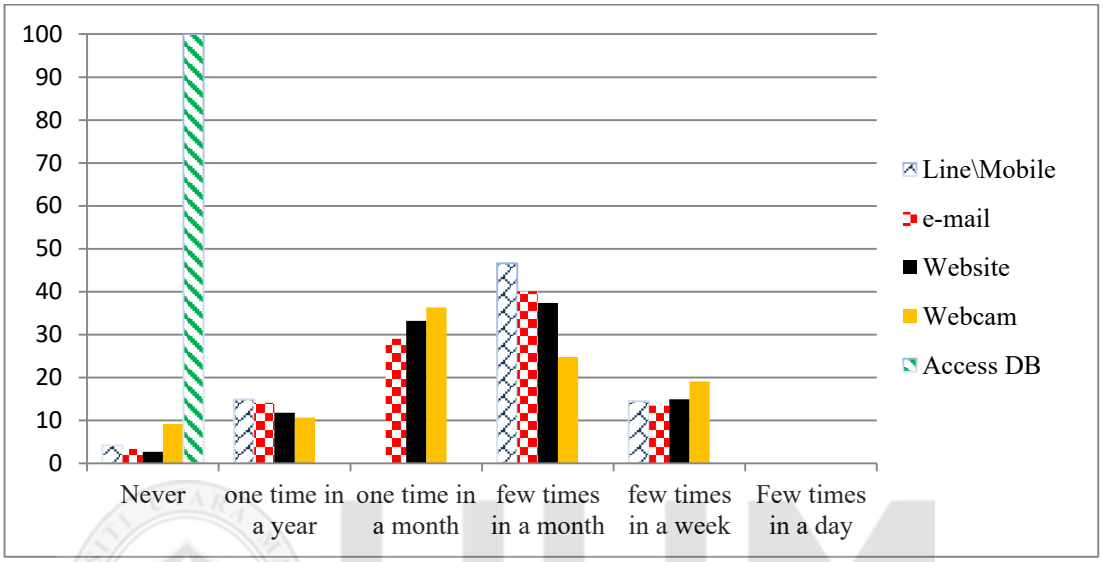

Figure 5.1. The use of electronic devices to share information between universities and MOHESR.

The analysis shows that the line\mobile and email are the most popular ways which is used by the universities' employees to share their information electronically with MOHESR. The employees of universities also use the website of MOHESR in order to get information. Moreover, the results show that the universities utilized webcam facilities frequently to exchange information face for facing with the ministry's staff. Finally, the universities' employees never allow accessing the ministry database in any privilege levels in order to get the ministry's information indirectly.

According to the interview, phone line, and mobile use few times a week, email use also few times in a week. The website is used only a few times in a month. Less than

one time in a month is the period of using a webcam. The employee mentioned that they never share their database with any universities and vise versa. Moreover, the interviewer also mentioned that there is use of CD/DVD in order to share the information electronically between MOHESR and Public universities.

5.4.2 Percentage and Year of Sharing Information

This study evidenced the existence of electronic information sharing between Iraqi public universities and MOHESR. The majority of participants (39.3%) agreed that they shared about 1% to 20% of their information electronically, while 20.6% of the participants shared about 21% to 40% of the information, 15.3% of the participants shared about 41% to 60%, and 24.8% of the shared about 61% to 80% of their information electronically. Figure 5.2 shows the percentage of total information being shared electronically with MOHESR. Interestingly, there is no university that shares more than 80% of the information with the ministry.

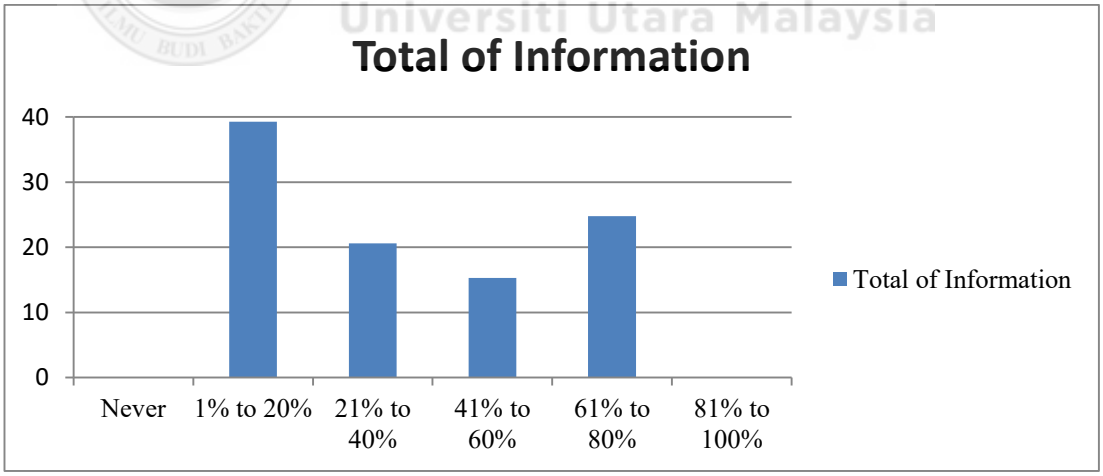

Figure 5.2. Percentage of total information that share electronically with MOHESR

This study moreover identified the number of years of electronic information sharing experiences between Iraqi public universities and MOHESR. About 38.2% of the participants claimed that they had shared information electronically within less than a

year, 13.7% of the participants have electronically shared between 1 to 3 years, 25.6% of the participants mentioned about 4 to 6 years, and 22.5% of the participants agreed from 7 to 10 years. No universities in the study share information electronically more than 10 years even though some universities are founded more than 10 years. Figure 5-3 illustrates the years of sharing information electronically with MOHESR. (APPENDIX M).

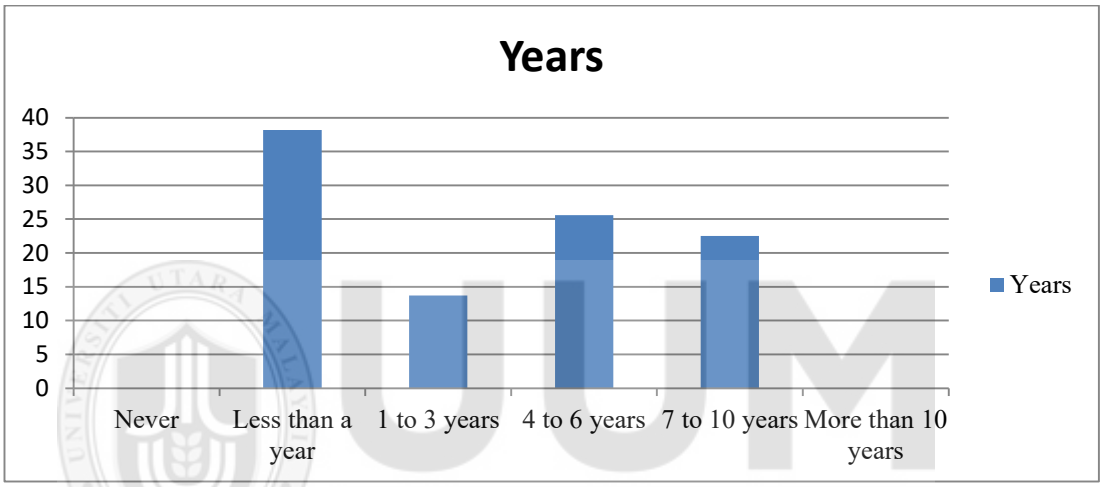

Figure 5.3. Years of sharing information electronically with MOHESR

According to Dr. Ghassan Nashat Mohammed, the percentage of electronic information sharing between MOHESR and public universities is % 60. Moreover, they started to share information electronically within 9 years. This concludes that the percentage of electronic information sharing between the Iraqi universities and the Ministry's employees electronically is not very actively in usage. Moreover, it also presents a situation that the electronic information sharing between Iraqi universities and MOHESR is still at a young age (Ghassan Nashat Mohammed, 2016, July, 15).

5.4.3 Type of Information that Public Universities Shared

This study also attempted to identify specific information electronically shared between the universities and the Ministry. Table 5.4 shows the type of information that universities share electronically with MOHESR such as, This information include about student information, staff information, academic information, requests and suggestions information, scholarship information, rules and policies information, and guidelines information. Moreover, it illustrates the percentage (Zero, 1% to 20%, From 21% to 40%, From 41% to 60%, From 61% to 80% and From 81% to 100%) of sharing these types of information that public universities shared electronically with MOHESR. For example, 14.1% of employees in public universities have never (Zero) share their *Student Information* electronically with MOHESR, 22.5% of them shared from 1% to 20% of their *Student Information* electronically, and so on.

The interviewer mentioned that information about students, academic staff, Dispatches, Policies, and Rules are shared electronically from %61-%80. Additionally, information about Administration staff, Suggestion, Guidelines, Scholarships, and studies are shared electronically from %41 to %60. According to Ghassan Nashat Mohammed, most of the information that is shared between MOHESR and public universities is the information about the student (Ghassan Nashat Mohammed, 2016, July, 15). Moreover, he said that MOHESR is willing to increase the electronic information sharing participation within its public universities. Finally, MOHESR needs to adopt technologies such as data warehouse to share their database information in order to increase the participation with pulic universities (APPENDIX A).

Table 5.4

Types and percentage of information that being shared electronically

Precentage	Student Information	Administrative Staff Information	Academic Staff Information	SuggestionsInformation	DispatchesInformation	Scholarship and StudiesInformation	Policies and Rules Information	GuidelinesInformation
Zero	14.1%	5.3%	1.9%	19.1%	16.4%	22.1%	3.1%	0.4%
From 1% to 20%	22.5%	22.5%	9.9%	15.6%	22.1%	1.5%	24.4%	19.1%
From 21% to 40%	22.1%	40.1%	41.6%	10.3%	6.1%	21.4%	16.4%	57.6%
From 41% to 60%	25.6%	16.8%	26.7%	24.0%	27.5%	41.6%	46.6%	6.1%
From 61% to 80%	15.6%	15.3%	19.8%	30.9%	27.9%	13.4%	9.5%	16.8%
From 81% to 100%	0%	0%	0%	0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%	100%	100%	100%

5.5 Validity and Reliability

As mentioned in previous chapter, **v**alidity, and reliability of the items are used in order to decrease the incorrect answers as possible during the stage of collection data, and testing the data goodness as well. Validity uses to measure what it is intended to measure by an accurate method for data collection (Sekaran and Bougie 2010), while reliability uses to make the item error free in order to get consistent results (Hair, 2010).

5.5.1 Convergent Discriminant Validity

Data were analyzed by utilizing principal component factor analysis using varimax rotation with Kaiser normalization technique. Kaiser-Guttman Rule (Eigenvalues greater than one) and scree plot were utilized in order to find the proper loading for the items (Chin et al. 1997; Pallant, 2013). Considering that the minimum of two items is required for factor analysis, all factors in this study can be analyzed (Pallant, 2013). Table 5-5 illustrates the results of the factor analysis of the principal component. The factor analysis found out the items that captured for the later analysis, thus, sixteen distinct variables (benefits, risks, costs, IT capability, information quality, compatibility, complexity, data warehouse, top management support, collaboration, size, policy/legal framework, interagency trust, upper-level leadership, critical mass and social network) were being indicated within the dependent variable.

In order to provide the best solution, the analysis should be based upon both convergent validity and discriminant validity. Therefore, the convergent validity was established depending on all the strong, loaded instruments according to their respective factors (loading >.40) (Chau and Tam, 1997). However, any particular

factor loaded strongly on its respective factor instead of another factor (Chau and Tam, 1997). Table 5-6 shows the discriminant validity analysis results.

Table 5.5

Factor Loading

Items	Ben	Risk	Cost	Itcap	IQ	Compat	Complix	DW	TMS	CC	Size	Policy	Trust	Upper	Mass	Network	DV
Ben1	**.710**																
Ben2	**.688**																
Ben3	**.756**																
Ben4	**.785**																
Ben5	**.711**																
Ben6	**.671**																
Ben7	**.475**																
Ben8	**.696**																
Risk1		**.801**															
Risk2		**.750**															
Risk3		**.908**															
Risk4		**.931**															
Risk5		**.746**															
Cost1			**.622**														
Cost2			**.892**														
Cost3			**.854**														
Cost4			**.926**														
ITcap1				**.607**													
ITcap2				**.754**													
ITcap3				**.825**													
ITcap4				**.837**													
IQ1					**.629**												
IQ2					**.874**												

| | | |

Trust1	**.914**					
Trust2	**.948**					
Trust3	**.865**					
Trust4	**.908**					
Upper1		**.835**				
Upper2		**.731**				
Upper3		**.822**				
Upper4		**.912**				
Mass1			**.884**			
Mass2			**.899**			
Mass3			**.900**			
Mass4			**.863**			
Network1				**.857**		
Network2				**.904**		
Network3				**.888**		
DSI					**.901**	
Percentage					**.654**	
Year					**.836**	
TOI					**.813**	

Ben: Benefits, Risk: Risks, Cost: Costs, ITcap: IT capability, IQ: Information quality, Compat: Compatibility, Complix: Complexity, DW: Data warehouse, TMS: Top management support, CC: concept collaboration, Size: Large size, Policy: Policy/legal framework, Trust: interagency trust, Upper: Upper level leadership, Mass: Critical mass, Network: Social network, DV: Dependent variable.

The correlations amid the factors are displayed by off-diagonal elements, while the diagonal elements illustrate the AVE square root. According to Staples, Hulland and Higgins (1999), the diagonal elements must be greater than another corresponding row or column entry so as to claim the discriminant validity. Each factor sufficiently differentiates from another factor. Thus, the measures display discriminant validity as shown in Table 5-6. Moreover, Table 5-6 illustrates the low correlation factors named; benefits, risks, cost, collaboration, size and critical mass.

As mentioned above, seventeen constructs were extracted from this study (sixteen independent variables and one dependent variable). These constructs are benefits, risks, costs, IT capability, information quality, compatibility, complexity, data warehouse, top management support, collaboration, size, policy/legal framework, interagency trust, upper-level leadership, critical mass, social network and increasing (dependent variable). In order to be sure that these constructs illustrate the minimum amount of variance, hence, the criterion approach had to be used in order to find the percentage of the variance.

Table 5.6

Discriminant Validity Analysis and Correlation

	BenNew	Risk	Cost	ITcap	IQ	Compat	Complix	DW	TMS	CC	Size	Policy	Trust	Upper	Mass	Network	DV
BenNew	**.746**																
Risk	.021	**.830**															
Cost	-.073	.009	**.832**														
ITcap	.066	.187**	-.051	**.761**													
IQ	.086	-.170**	-.045	.073	**.774**												
Compat	-.020	-.080	.021	.099	.010	**.805**											
Complix	-.011	.451**	.002	.106	-.091	-.102	**.911**										
DW	-.019	.016	.061	-.029	.054	.018	.045	**.787**									
TMS	.074	.001	.020	.095	.298**	.005	-.054	.032	**.644**								
CC	-.042	.184**	-.113	-.091	.024	-.002	-.071	-.044	.057	**.801**							
Size	.015	.184**	.010	-.044	.011	-.060	.087	.008	.065	.214**	**.770**						
Policy	-.028	.004	.059	-.106	.108	.023	-.067	-.024	.045	.065	.008	**.876**					
Trust	-.006	.005	-.044	.334**	.025	.073	-.022	.088	.234**	.005	.001	.031	**.909**				
Upper	.051	.111	.005	.113	.043	.031	.114	.038	.154*	.101	.104	.045	.263**	**.827**			
Mass	-.038	-.109	.005	-.008	.052	-.026	-.089	-.040	.223**	.158*	.079	.067	.003	.019	**.886**		
Network	.071	-.065	.058	.203**	.148*	.024	-.079	.096	.018	.110	.000	.125*	-.053	.021	.028	**.883**	
DV	***.024***	***-.111***	***-.017***	***.284****	***.395****	***.281****	***-.149****	***.137****	***.482****	***.085***	***.006***	***.296****	***.457****	***.239****	***.110***	***.351****	**.806**

Note. The bold diagonal elements are the square root of the variance shared between the constructs a their measures (i.e., the average variance extracted). Off diagonal elements are the correlations between constructs. For discriminant validity, the diagonal elements should be larger than any other corresponding row or column entry.

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The factor solution provides the summary of variance, cumulative variance, and eigenvalues in Table 5-7. Information about the extracted constructs or components is obtained from the extorted summation of squared loadings groups. The values of principal components extraction will be similar to those stated under initial eigenvalues.

Table 5.7

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5.181	8.356	8.356	5.181	8.356	8.356
2	4.439	7.160	15.517	4.439	7.160	15.517
3	3.949	6.370	21.887	3.949	6.370	21.887
4	3.595	5.798	27.685	3.595	5.798	27.685
5	3.312	5.341	33.026	3.312	5.341	33.026
6	3.019	4.869	37.895	3.019	4.869	37.895
7	2.862	4.616	42.511	2.862	4.616	42.511
8	2.421	3.904	46.415	2.421	3.904	46.415
9	2.364	3.813	50.229	2.364	3.813	50.229
10	2.308	3.723	53.952	2.308	3.723	53.952
11	2.175	3.507	57.459	2.175	3.507	57.459
12	2.050	3.306	60.766	2.050	3.306	60.766
13	1.761	2.841	63.606	1.761	2.841	63.606
14	1.641	2.648	66.254	1.641	2.648	66.254
15	1.544	2.490	68.744	1.544	2.490	68.744
16	1.320	2.128	70.873	1.320	2.128	70.873
17	1.136	1.833	72.706	1.136	1.833	72.706

A grouping of constructs of total variance should be 60% or more in order to consider suitable in social sciences (Hair *et al.,* 2013). The results of this study as displayed in Table 5-7 reveal that the first constructs provide the large value of the total variance, the seventeen constructs that are extorted value for the total variance is 72.706%. Therefore, the seventeen constructs can be applied in the investigation of the question of the study.

5.5.2 Reliability Assessment

The internal consistency was determined according to the calculation of the average inter-item correlations by Cronbach's alphas. Measures are typically reliable with the presence of greater correlations between other measures or larger Cronbach's alphas. The scales of the Cronbach's alpha values are from 0.7 and above. The alpha coefficient has no standard limitation point. However, there is a general lower limit of .70 for the Cronbach's alpha. Results of the reliability analysis are illustrated in Table 5-8. Complexity, interagency trust, critical mass factors have a high level of reliability. Risks, IT capability, information quality, data warehouse, top management support and upper-level leadership have lower reliability.

Table 5.8

Reliability test and AVE

Factor name	Cronbach's Alpha	AVE
Benefits	0.797	0.557
Risks	0.703	0.690
Costs	0.858	0.692
IT Capability	0.700	0.579
Information Quality	0.702	0.600
Compatibility	0.788	0.649
Complexity	0.995	0.829
Data warehouse	0.704	0.620
Top management support	0.702	0.414
Collaboration	0.803	0.643
Size	0.713	0.593
Policy/ Legal framework	0.864	0.768
Interagency Trust	0.941	0.826
Upper-Level Leadership	0.703	0.684
Critical Mass	0.921	0.786
Social Network	0.897	0.780
DV	0.708	0.649

A more rigorous test for the reliability was also carried out whereby there is an assessment for the variance amount captured by a factor's measure with respect to the variance amount due to error of measurement, so as to ensure that the low Cronbach's alpha value of the dependent variable factor creates no issue (Fornell and Larcker 1981). The variance extorted by the factor's measure (AVE) have to be higher than 0.50 to be able to claim reliability. All the Average Variance Extracted values for the independent variables, as well as the dependent variable, are more than 0.50 according to the table 5.8. Hence, in this study, all the reliabilities are considered acceptable.

5.6 Hypothesis Testing

This section presents the results of regression analysis in order to test the relation between independent and dependent variable.

5.6.1 Regression Analysis

The method of multiple regressions was used step by step in order to test sixteen hypotheses of the study. SPSS version 20 was served as the instrument for the statistical analysis. The dependent variable in this study was participation in electronic information sharing while the independent variables included were benefits, risks, costs, IT capability, information quality, compatibility, complexity, data warehouse, top management support, collaboration, size, policy/legal framework, interagency trust, upper-level leadership, critical mass, social network.

As referred in Table 5.9, IT capability, information quality, compatibility, complexity, data warehouse, top management support, policy/legal framework, interagency trust, upper-level leadership and social network were found to be significant determinants

of participation in electronic information sharing. Moreover, the Table 5.9 shows that all the factors had significance level less than .05. However, benefits, risks, costs, collaboration, size, and critical mass were excluded statistically from the model by the step by step regression method because significance level of these factors were more than .05 (see table 5.10). The statistics for the removed variables from the model and remained in the model are displayed respectively in 5.9 and 5.10. Additionally, Table 5.9 even illustrates the model which summarizes the statistics results that are obtained from the regression analysis. Kindly refer to APPENDIX N for detailed explanations of the multiple regressions.

Table 5.9

Significant factors

Independent Variables in	**Beta**	**t-value**	**Significance**
IT capability	.284	4.775	.000***
Information quality	.395	6.940	.000***
Compability	.281	4.728	.000***
Complexity	-.149	-2.431	.016*
Data warehouse	.137	2.237	.026*
Top management support	.482	8.874	.000***
Policy/legal framework	.296	5.003	.000***
Interagency trust	.457	8.294	.000***
Upper level leadership	.239	3.967	.000***
Social network	.351	6.048	.000***

Model Summary			
F = 48.109 p = .000 Darbin Wastin= 2.175	R= .811	R^2= .657	Adj. R^2 = .643

Beta: Standardized regression coefficients (β)
* denotes significance at the p < .05
** denotes significance at the p < .01
*** denotes significance at the p < .001

The step by step multiple regressions comprises of an automatic search process that creates the best subset of the independent variables. This research method gives rise to a sequence of regression models and as such adding or removing an independent variable at each step. Table 5.10 shows the six variables that have significance greater than 0.05. These variables are not considered in the final model. Moreover, correlations between the excluded and included variables were analyzed so as to make sure that the removed variables were not excluded because of masked significance by the multi-regression. Supporting evidence of Table 5.6 has confirmed that all the removed variables did not seem to be highly correlated with variables that were used in the final model. Hence, the conclusion that can be drawn is that variables were not expelled because of the multi-regression.

Table 5.10

Nonsignificant factors

Independent Variables	Beta in	t-value	Significance
Benefits	.024	.380	.704
Risks	-.111	-1.809	.072
Costs	-.017	-.279	.781
Collaboration	.085	1.370	.172
Size	.006	.092	.927
Critical mass	.110	1.780	.076

Beta in: Standardized regression coefficients (β) that would result if the variable were entered into the equation at the next step.

A summary of the regression results describes the ten factors which can increase the electronic information sharing between public universities and the MOHESR in Iraq. The electronic information sharing factors are shown in Figure 5.4. Kindly refers to APPENDIX O for more explanations of the model summary.

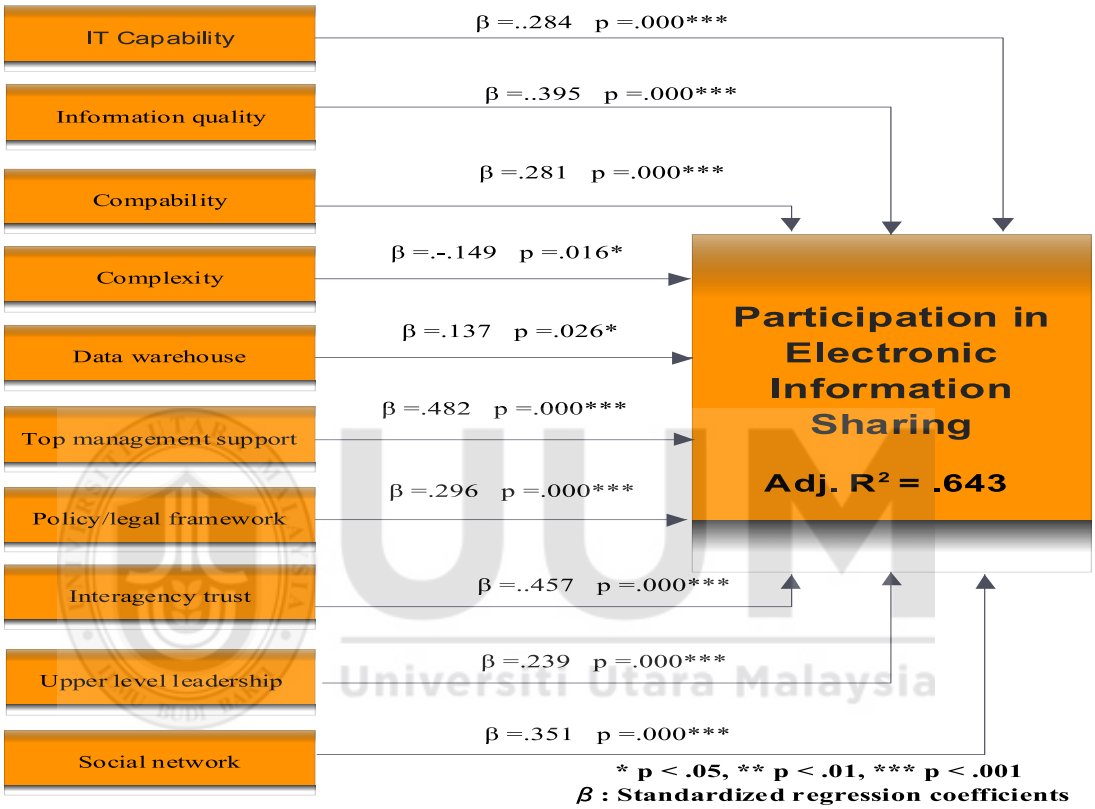

Figure 5.4. Factors that Influence the increasing of Electronic Information Sharing between Public Universities and MOHESR.

In accordance to the results of the multiple regression, there is correlation between the dependent variable and the set of ten independent variables (F* = 48.109 > Durbin Waston= 2.175< 2.5 and p = .000 < .05) at the α=.05 level. Top management support factors has the most significant value among others. Additionally, as shown in the results, there are ten independent variables remained in the model which made up to 64.3% (Adjusted R^2) of the variance in increasing the electronic information sharing. Table 5.11summarizes the results acquired from the hypotheses testing.

Table 5.11

Hypotheses and its results

	Hypotheses	Results
H1	Benefits will have a positive effect on electronic information sharing between Iraqi public universities and MOHESR.	Not Supported
H2	Risks will have a negative effect on electronic information sharing between Iraqi public universities and MOHESR.	Not Supported
H3	Costs will have a negative effect on electronic information sharing between Iraqi public universities and MOHESR.	Not Supported
H4	IT capability will have a positive effect on electronic information sharing between Iraqi public universities and MOHESR.	Supported
H5	Information quality will have a positive effect on electronic information sharing between Iraqi public universities and MOHESR.	Supported
H6	Compatibility will have a positive effect on electronic information sharing between Iraqi public universities and MOHESR.	Supported
H7	Complexity will have a negative effect on electronic information sharing between Iraqi public universities and MOHESR.	Supported
H8	Data warehouse will have a positive effect on electronic information sharing between Iraqi public universities and MOHESR.	Supported
H9	Top management support will have a positive effect on electronic information sharing between Iraqi public universities and MOHESR.	Supported
H10	The good collaboration will have a positive effect on electronic information sharing between Iraqi public universities and MOHESR.	Not Supported
H11	The Large size will have a positive effect on electronic information sharing between Iraqi public universities and MOHESR.	Not Supported
H12	Policy/legal framework will have a positive effect on electronic information sharing between Iraqi public universities and MOHESR.	Supported
H13	The Interagency Trust will have a positive effect on electronic information sharing between Iraqi public universities and MOHESR.	Supported
H14	Upper-level leadership will have a positive effect on electronic information sharing between Iraqi public universities and MOHESR.	Supported
H15	Critical mass will have a positive effect on electronic information sharing between Iraqi public universities and MOHESR.	Not Supported
H16	Social network will have positive effect on electronic information sharing between Iraqi public universities and MOHESR.	Supported

The benefits' hypothesis was to test the effects of benefits to the increase electronic information sharing between public universities and MOHESR. The hypothesis has suggested that benefits of electronic information sharing would have a positive influence on public universities to increase the electronic information sharing. According to the result, the analysis has shown a p-value of 0.704 ($p > 0.05$), β value is 0.024 and t-value is 0.380 for this particular factor. Thus, this variable is not considered to be significant and hence excluded from the model. The result for benefits did not support the hypothesis.

The second hypothesis was investigating the effects of risks to increase the electronic information sharing between public universities and MOHESR. Based on the hypothesis, the factor risks would have a negative effect on public universities to increase the electronic information sharing. The p-value was more than 0.05 ($p=0.072$), $\beta= -0.111$ and t-value= -1.809. Hence, the results obtained for risks did not support this hypothesis.

The hypothesis for the factor costs suggested that it would cause a negative influence on public universities to increase electronic information sharing. This hypothesis was testing for the effects of costs for increasing electronic information sharing between public universities and MOHESR. However, the analysis revealed that the hypothesis was not supported since the p-value was found to be 0.781 (that is $p > 0.05$), $\beta= -0.017$ and t-value= -0.279.

IT capability hypothesis examined the effects of IT capability to increase electronic information sharing between public universities and MOHESR. From the hypothesis, IT capability was shown to reflect a positive influence upon public universities towards increasing of the electronic information sharing. This hypothesis was proved to be supported based on the analysis made on the results of IT capability whereby the p-value was less than 0.001 (p= 0.000), β= 0.284 and t-value = 4.775.

Information quality factor identified the quality of university's information that shares electronically with MOHESR. The hypothesis of information quality factor proposed that information quality would make a positive influence on public universities upon increasing of electronic information sharing. The analysis results for supporting the hypothesis of this factor. The β coefficient was found to be 0.395, t-value= 6.940 and p-value less than 0.001 (p= 0.000).

Compatibility factor referred to interoperability of software, hardware, and IT skills between public universities and ministry of higher education. The factor compatibility has been proved to support the hypothesis, that is, it would have a positive effect on public universities for increasing electronic information sharing. According to the results obtained for compatibility accept this hypothesis as the p-value = 0.000 ($p < 0.05$), Beta value = 0.281, and t-value= 4.728.

The hypothesis of complexity probed the effects of complexity to increase the electronic information sharing between public universities and MOHESR. The hypothesis suggested that complexity of electronic information sharing would have a negative effect on public universities to increase the electronic information sharing.

The analysis of the results of this factor were p-value= 0.016 ($p < 0.05$), β= -0.149 and t-value = -2.431; hence, the hypothesis for this factor has been proved to be supported.

The analysis made on data warehouse hypothesis has provided results of p-value= 0.026 ($p< 0.05$), Beta value= 0.137 and t-value= 2.237. This hypothesis was testing for the influence of data warehouse upon increasing electronic information sharing between public universities and MOHESR. According to the hypothesis H_8, data warehouse was found to have a positive influence. Based on the analysis the p, beta and t values support this hypothesis.

Top management support has echoed positive influence upon increasing of electronic information sharing. The hypothesis of top management support factor was testing for the effects of this factor for increasing the electronic information sharing between public universities and MOHESR. The analysis has produced results that prove to support this hypothesis with the p-value of 0.000 ($p< 0.001$), β= 0.482, and t-value= 8.874.

Hypothesis on good collaboration studied the effects of good collaboration for increasing the electronic information sharing between public universities and MOHESR. Good collaboration hypothesis describes that good collaboration would have a positive effect on public universities to increase the electronic information sharing. The analysis yielded p-value= 0.172 ($p> 0.05$), β= 0.085 and t-value= 1.370. Therefore, the results did not support this hypothesis and as such this factor was eliminated from the model.

The hypothesis of large size factor observed its effect upon increasing of electronic information sharing between public universities and MOHESR. The latter has illustrated that a positive influence could be obtained to increase the electronic information sharing. The results of this analysis did not support this hypothesis, and this variable was removed from the model since the p-value was more than 0.05 (p= 0.927), Beta value= 0.006, and t-value= 0.092.

Policy\legal framework referred to policies and rules that can affect electronic information sharing. Policy\legal framework hypothesis explained the positive influence on public universities to increase electronic information sharing. The analysis made for this factor has provided p-value less than 0.001 (p-value= 0.000), β= 0.296, and t-value= 5.003. Hence, the hypothesis for this factor has shown a supporting result.

The hypothesis of interagency trust has revealed a positive influence to increase electronic information sharing. The p-value was found 0.000 (p<0.001), Beta value= 0.457, and t-value= 8.294. This provided an evidence of supporting this hypothesis.

Hypothesis of upper-level leadership checked the effects of upper-level leadership for increasing the electronic information sharing between public universities and MOHESR. The hypothesis explicated that upper-level leadership would have a positive effect on public universities to increase the electronic information sharing. The values obtained was p= 0.000 (p<0.001), β= 0.239, and t= 3.967. The results support the hypothesis.

Critical mass is also another factor which was shown not to increase the electronic information sharing between public as explained in the critical mass hypothesis. Nevertheless, the analysis did not obtain supporting results for this hypothesis. According to analysis p= 0.076 (p>0.05), β= 0.110 and t= 1.780. Therefore, this factor was removed from this model.

Critical mass is also another factor which was shown not to increase the electronic information sharing between public as explained in critical mass hypothesis. In this study, the analysis did not obtain supporting results for this hypothesis. According to analysis p= 0.076 (p>0.05), β= 0.110 and t= 1.780. Therefore, this factor was removed from this model.

Ten factors have been found as supporting factors to increase electronic information sharing between public universities and MOHESR; IT capability, information quality, compatibility, data warehouse, top management support, policy/legal framework, interagency trust, upper-level leadership and social network that had a positive influence; and complexity with negative influence. Nevertheless, six factors have not supported electronic information sharing, which are benefits, risks, costs, collaboration, size, and critical mass. Hence, based on the findings, from the 16 factors tested, only ten supported factors can increase electronic information sharing among public universities and MOHESR.

5.7 Conclusion

The chapter provides a comprehensive discussion of the data analysis techniques utilized in this study, and the results obtained in order to evaluate the model. The response rate, missing data and nonresponse bias were explained, while the validity and reliability analysis of the instrument were examined. The factor analysis test showed the only loaded items more than 0.5. The correlation and regression tests proved ten variables as supported (IT capability, information quality, compatibility, complexity, data warehouse, top management support, policy/legal framework, interagency trust, upper level leadership and social network) while six variables are not supported (benefits, risks, costs, collaboration, size, and critical mass). The research model and hypotheses are discussed and the results obtained from these tests are presented. Finally, the ten supported factors can be utilized to increase the information sharing electronically amongst Iraqi public universities and MOHESR.

CHAPTER SIX

DISCUSSION AND CONCLUSION

6.1 Introduction

The first step of this study was started with an identification of the background of the research, the importance of electronic information sharing, research problem, research questions, research objectives, research scope and research significance. The second step was the review of the literature in order to understand more about the area of study, find the research barriers and gaps, and the relative works to support the research. It continued with the set-up of the theoretical model and the hypotheses based on the inputs from previous research, TOE framework, transactive memory system, social exchange, and critical mass theories. The next step was the explanation of the research process, the selection of the proper research methodology, data collection, survey, questionnaires design, and pilot study, validation of the research, data analysis, and results. Finally, this chapter presents the outcomes and the achievements of this study. It also discusses the findings, limitations, contributions, and limitation of the study. The theoretical and practical contributions are presented, followed by a discussion of the future research. Additionally, conclusions are drawn concerning the research effort.

This chapter explains the findings and result of the research objectives which are stated in Chapter 1. The main objectives of this study are as follow:

1. To identify the barriers of electronic information sharing between Iraqi public universities and MOHESR.

2. To identify factors that can increase the electronic information sharing between Iraqi public universities and MOHESR.
3. To propose a theoretical model that can increase the electronic information sharing between Iraqi public universities and MOHESR.

6.2 Summary of Research Achievements

This section illustrates the summary achievements of the research objectives based on the research questions.

6.2.1 Research Question 1: What are the barriers of electronic information sharing between Iraqi public universities and MOHESR?

Research Objective 1: To identify the barriers of electronic information sharing between Iraqi public universities and MOHESR.

This research objective was achieved from the interview with employees in MOHESR in order to identify the barriers that higher education institutions face in Iraq. Four major barriers have been found. The first barrier refers to the electronic information sharing characteristics (the risks factor is the main factor in this characteristics), the second barrier explains about technological characteristics (IT capability, information quality and compatibility are the most influence factors in this barrier), and the third barrier examines the organization characteristics (top management support is the most significant factor). The final barrier is the environment characteristics (the most influence factors in this barrier are policy/legal framework, interagency trust, upper-level leadership and social network). In this study, these four barriers were considered as the main barriers of electronic information sharing between Iraqi public universities

and the Ministry of Higher Education and Scientific Research. Figure 6-1 illustrates barriers of electronic information sharing in higher education sector in Iraq.

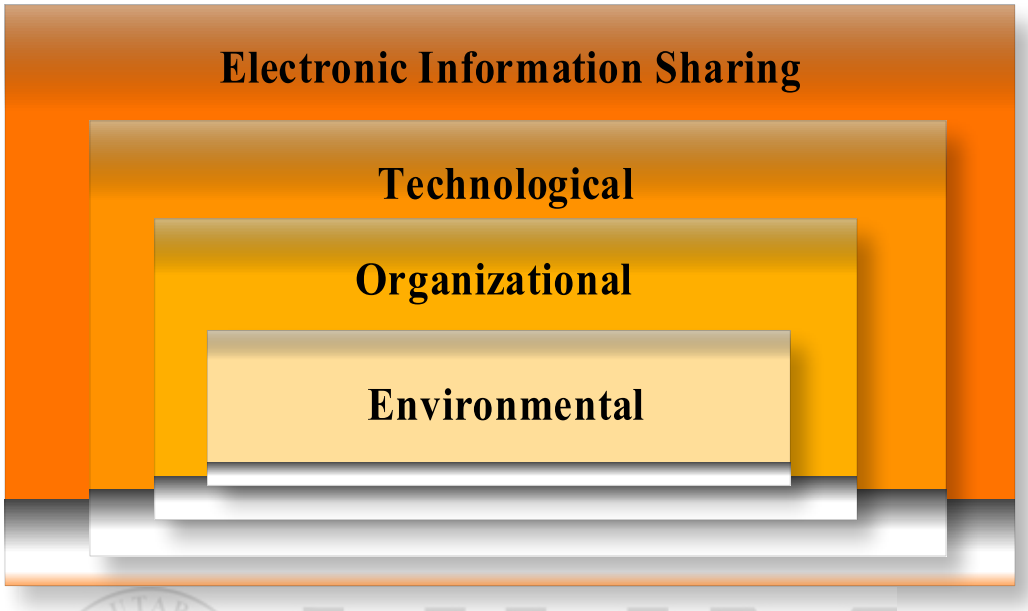

Figure 6.1. Four barriers of electronic information sharing in higher education

6.2.2 Research Question 2: What are the factors that can increase the electronic information sharing between Iraqi public universities and MOHESR?

Research Objective 2: To identify factors that can increase the electronic information sharing between Iraqi public universities and MOHESR.

The second objective was successfully achieved based on the sixteen factors that were tested to have influence in increasing the electronic information sharing between Iraqi public universities and the Ministry of Higher Education and Scientific Research. From these factors, thirteen factors were found with a positive effect, and the remaining three have a negative effect. These factors have been discovered from the relative studies of electronic information sharing and based on social exchange theory

and critical mass theory. Top management support, interagency trust, and upper-level leadership factors were from Social Exchange Theory, the critical mass factor was based on Critical Mass Theory, and the size factor was from TOE framework.

Benefits, risks, costs, IT capability, quality information compatibility, complexity, data warehouse, collaboration, policy/legal framework and social network have been investigated from the previous studies of electronic information sharing. In addition, this study also suggested data warehouse as an influencing factor in order to increase electronic information sharing. Data warehouse factors are considered as a contribution in this research which was discovered base on Transactive Memory System Theory. This factor was found to have a positive effect to increase sharing information electronically between public universities and MOHESR. However, ten supported factors have been found in this study. Figure 6-2 shows the ten supported factors that were proven to increase the electronic information sharing between Iraqi public universities and MOHESR.

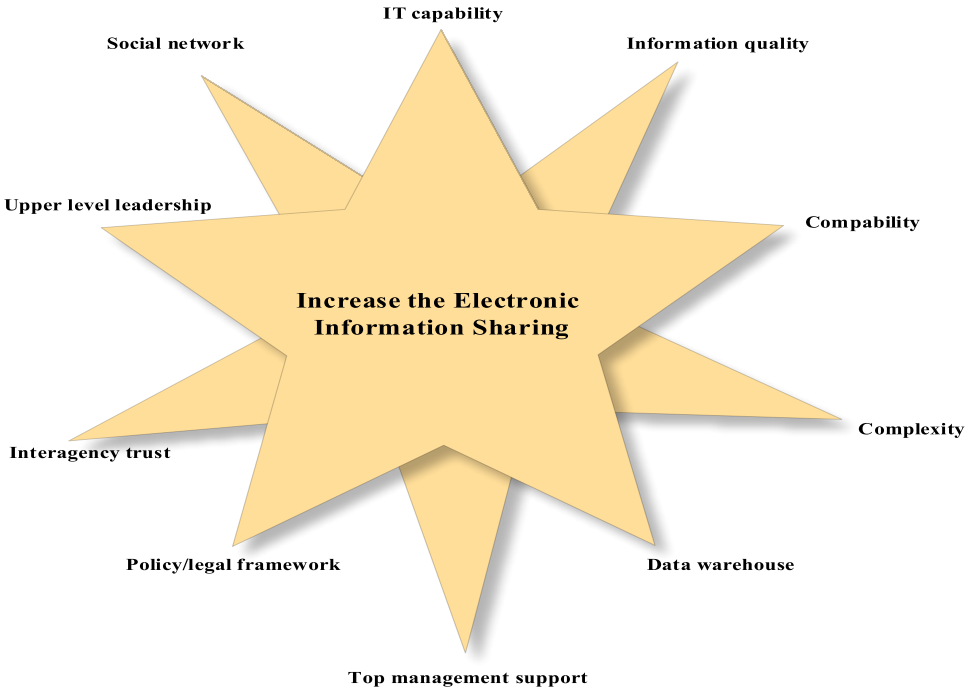

Figure 6.2. The suggested factors of electronic information sharing.

6.2.3 Research Question 3: How to guide the implementation of electronic information sharing between Iraqi public universities and MOHESR?

Research Objective 3: To propose a theoretical model that can increase the electronic information sharing between Iraqi public universities and MOHESR.

In order to achieve the third objective, a theoretical model of electronic information sharing between Iraqi public universities and MOHESR has been proposed. The model was proposed based on the four electronic information sharing barriers and sixteen influence factors of electronic information sharing.

The final model of this study consists of sixteen influence factors electronic information sharing section 3.2, page 93. The theoretical model of this study has

depicted in Figure 3.2. Figure 6-3 shows a summary of the findings from the survey conducted. In the following subsections, these findings are discussed in greater detail and recommendations concerning how to increase public universities participation in electronic information sharing initiatives are provided.

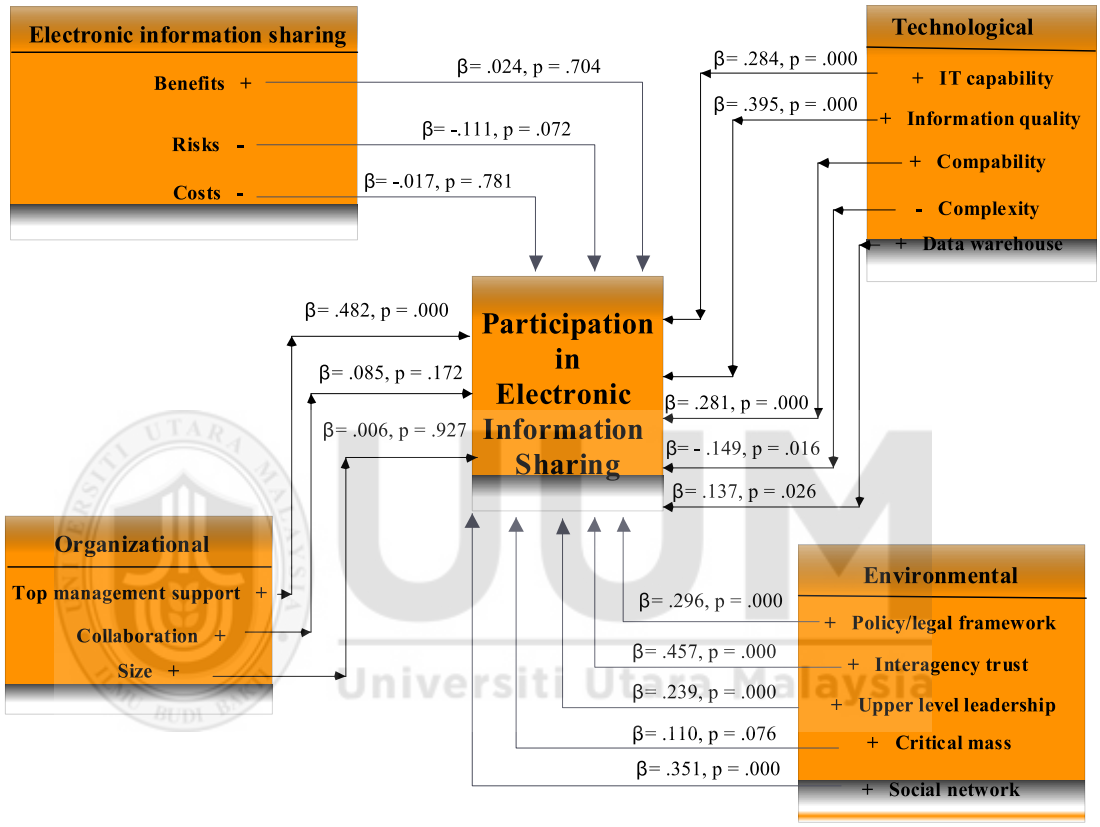

Figure 6.3. A summary of the survey

6.2.3.1 Benefits

The effect of benefits on increasing the electronic information sharing in public universities was found to be insignificant (β= .024, p = .704). The benefits of electronic information sharing between several public organization are still unclear and hidden (Bigdeli, 2012). Moreover, Akbulut (2003) found that there is no influence of benefits factor in electronic information sharing in the public sector. But this does not

necessarily mean that the benefits of electronic information sharing did not find particular to increase the electronic information sharing in the public sector. However, according to Jing and Pengzhu (2009), most government top managers and staffs have noticed the benefits of electronic information sharing in their organizations. Moreover, Bigdeli (2012) augured about the importance of benefits factor in electronic information sharing in three difference local governments.

One possible explanation of the findings of this study is that even though employees in public universities did not notice the benefits of electronic information sharing in general, but benefit factor might have an influence effect in electronic information sharing in their universities. That influence effect might be due to the differences in expectations, assumptions, or knowledge about the key aspects of the electronic information sharing between the universities and MOHESR. In this respect, the effect of benefits on increases the electronic information sharing should be examined in relation to the universities' ability to increase in such initiatives and take advantage of electronic information sharing's benefits.

Based on these findings, it can be argued that benefits might influence the increase of the electronic information sharing between public universities and MOHESR. Therefore, in order to increase universities participation in electronic information sharing, promotional efforts could be targeted at non-participant staff to increase their awareness of the benefits of electronic information sharing. Moreover, electronic information sharing could be designed in a way to benefit all the participant universities. When considering electronic information sharing projects, potential

benefits could be taken into consideration along with intra-agency needs and abilities to assimilate electronic information sharing technologies (Akbulut, 2003).

6.2.3.2 Risks

The findings of this study found that hypothesis risks are not significant (β= -.111, p = .072).According to Gil-Garcia & Pardo (2005) the extent to which practitioners have found the results of years of IS research relevant to their efforts to produce tools that limit the risk of IT initiatives is unclear. Risk tends to be undeveloped and contributes to lowered credibility (Gil-Garcia & Pardo, 2005). However, according to Jing Pengzhu & Yen (2014) risks factor fail to produce a negative influence on the performance of electronic information sharing in the public sector. Universities' participant who shares information are acquainted of electronic information sharing risks, but it does not mean that there are no risks while sharing university's information electronically with MOHESR.

According to Yan, Sun and Wang (2009), Akbulut (2011) and, Bigdeil, Kamal and de Cesare (2013a), the risk is considered as one of the main issues that decrease staff's participation on electronic information sharing in the public sector. However, based on these findings; it can be argued that risks might decrease the electronic information sharing between public universities and MOHESR. Therefore, in order to increase the electronic information sharing in these universities, the electronic information sharing system could be designed in a way to reduce all the risks while sharing information electronically. Moreover, participants should be aware on the risks of sharing information electronically to increase the sharing of information electronically.

6.2.3.3 Costs

The results of costs factor in electronic information sharing of this study was not supported by this hypothesis (β= -.017, p = .781). The previous studies of electronic information sharing show that there is an important influence of costs factor in the public sector (Akbulut et al., 2009; Jing and Pengzhu, 2009; Akbulut, 2011; Bigdeil, 2012; Jing Pengzhu & Yen, 2014). However, Ministry of Higher Education and Scientific Research has increased its expenses for its universities in the last few years in order to enhance the education system (MOHESR, 2012; 2014). Therefore, electronic information sharing in universities was found to be more able to obtain grants from MOHESR sources to support their electronic information sharing. Also, MOHESR pays all the cost of building any new project for any university. Therefore, there is no financial issue for the universities in order to adopt new projects. However, based on these findings, it can be argued that costs might affect the increasing of electronic information sharing between the public universities with MOHESR. Therefore, in order to increase universities participation, the electronic information sharing project could be designed to decrease the costs of electronic information sharing among public universities and MOHESR.

6.2.3.4 IT Capability

The results of this study show IT Capability supported influence (β= .284, p = .000). The findings showed that these universities need to have the necessary technological resources to increase the electronic information sharing with MOHESR. These universities seemed to have already acquired a certain level of IT infrastructure, and their employees were trained in using information technologies, but they are looking for more enhancements in software, hardware, and IT skill. In general, most of the

universities lack of advanced computer resources and their employees have limited IT skills and knowledge.

Based on the results of this study, it can be discussed that IT capability influences the increasing of the electronic information sharing amongst public universities and MOHESR. Most of the electronic information sharing projects are created based on the existing information technologies and skills of the staff. Thus, universities can use their current skills and technologies in electronic information sharing while improving their skills and infrastructure. In this respect, in order to increase the electronic information sharing between these universities and ministry, a new technology might be very useful. It is suggested that the universities adapt suitable free smart mobile applications for the purpose of increasing the electronic information sharing. In another hand, ministry's technology resources can also be used in order to help public universities acquire compatible technologies at low costs. Additionally, it can also provide useful assistance by giving training to the universities staff and providing direct assistance as call or email.

6.2.3.5 Information Quality

Information quality was one of the factors that significantly increase the electronic information sharing between these universities and the ministry (β= .395, p = .000). The findings suggested that information quality is needed in public universities in order to increase the electronic information sharing with MOHESR. These universities shared the good quality of information with the ministry. Generally, quality of information can help to improve the trust among the staff in the universities as well as the ministry. Moreover, the information quality can enhance the quality of the

decisions in these universities. The possible explanation is that the meaning of information may change over time so as its usefulness even for the same staff; therefore information quality should be defined relative to its actual practical use of information.

The findings confirmed that information quality is important to public universities staff because it helps to reduce processing time, enhance the working procedures and make quality decisions. In another way, universities need to share a good quality information and meaningful information as feedback with MOHESR. Therefore, it can increase the electronic information sharing from the both sides. It should be noted that the universities carefully considered information quality as the most important initiatives while sharing the information electronically with MOHESR.

6.2.3.6 Compatibility

The results of the hypothesis of compatibility factor are significant (β= .281, p = .000). Based on the findings, public universities need to have a compatible infrastructure with MOHESR (that is in terms of software and hardware) and IT skills in order to facilitate and increase electronic information sharing among them. In general, the technologies that enable electronic information sharing may differ across universities and the ministry. Moreover, IT skills and knowledge need to be updated between the staff in the public universities and MOHESR. In summary, the public universities and MOHESR should collaborate in order to provide more technological and organizational compatibilities between them.

In order to have organizational and technological compatibility, MOHESR and public universities should take further effort in designing information sharing systems and provide same training for staff. This can be done through a careful investigation on the existing ITs and available information system. This can happen by working together as a team in order to develop systems that are fully integrated. For example, data warehouse system can be developed as an integrated platform for ministry and its public universities. Moreover, the ministry can provide guidelines on technology purchases, assist public universities in procuring compatible solutions, and offer other forms of technological assistance.

6.2.3.7 Complexity

The results of hypothesis in this research shows that complexity has influenced support (β= - .149, p = .016). The findings of the study explained that the public universities are perceiving electronic information sharing as a complex technology. Moreover, the complexity of electronic information sharing technologies deceases the willingness and desire of participation because it needs more knowledge, skills, and effort from public universities to increase the electronic information sharing activities. Therefore, in order to increase the electronic information sharing the technologies that used to share the information electronically with MOHESR should be easy to use and user-friendly.

Based on these findings, it can be explained that complexity influences the increasing of electronic information sharing between public universities and the ministry. There are necessary needs to understand the level of difficulty for each employee as well as their capabilities and knowledge in information technology. Thus, providing

guidelines and training of information technology can reduce the complexity of electronic information sharing project among employees.

6.2.3.8 Data Warehouse

The results of hypothesis in this research shows a significant relationship (β= .137, p = .026). Based on the findings, public universities need to store its information in a common data warehouse with the ministry in order to increase the electronic information sharing with them. In general, the data warehouse can provide more available and easily accessible information. Storing the ministry and public universities' information in a common storage can increase the indirect electronic information sharing between them. Moreover, the information can be accessed by authorized employees with privileges.

Based on these findings, it can be argued that data warehouse can increase the electronic information sharing among public universities and the ministry. In order to increase electronic information sharing between them, it might be useful to build data warehouse system with high integrated information and high compatibility. This necessity needs more understanding of the data warehouse technologies in the ministry and public universities because the staffs have limited knowledge and experience about it. However, the data warehouse can bring advantage but might not be responsive to individual needs.

6.2.3.9 Top Management Support

The effect of top management support in public universities to increase electronic information sharing was found to be significant (β= .482, p = .000). Based on the findings, top managers consider the electronic information sharing with MOHESR is an important feature to support their university. They also encourage staffs to share their information electronically with the ministry. Moreover, they can motivate their staff to increase the sharing by offering rewards or incentives. In general, the top managers of the public universities are interested in sharing the university's information electronically with the ministry of higher education and scientific research. Moreover, according to the results, top management support is needed to ensure that the necessary funding and other resources can be obtained for sharing information electronically.

6.2.3.10 Collaboration

The previous literature on information sharing and integration in inter-department collaboration mainly focused on examining the causal interrelationship between the factors (Pardo and Tayi, 2007). Bigdeli (2012) argued that collaboration factor has an influence effect on electronic information sharing in the local government. This study, however, found that collaboration did does not influence the participation in electronic information sharing (β= .085, p = .172). This characteristic makes information sharing effort even riskier and might result in the unpleasant outcome (Thomas and Walport, 2008). Moreover, Bigdeli research found that there is a collaboration issue in low level of the organization of the electronic information sharing in inter-departmental (Bigdeli, 2012).

Based on these findings, the universities' participants do not expect an influence by the collaboration in order to increase their electronic information sharing with MOHESR. However, universities may enhance the collaboration concept between its staff and MOHESR staff in order to increase the electronic information sharing among them because the collaboration might have an influence for some employees in the university.

6.2.3.11 Size

The results of this study show the size factor did not have an effect on universities' participation in electronic information sharing (β= .006, p = .927). This finding supports Bigdeli (2012) where the size factor has no influence effect on electronic information sharing in the public sector. Large organizations mostly had very heavy workloads because of their duties as well as the high amount of information. Hence, it was difficult for them to share their resources (Akbulut, 2003). Based on these findings, universities' participations are not influenced by the size of public universities in order to increase electronic information sharing with MOHER. Therefore, size factor does not have an influence effect on electronic information sharing among public universities and MOHESR.

6.2.3.12 Policy/ Legal framework

According to the analyzing result, the effect of policy/legal framework was found to be significant in influencing the participation of electronic information sharing in public universities and MOHESR (β= .296, p = .000). Based on the findings, public universities need legislation and policies in order to share their information electronically. Thus, the public universities are looking for the legislations and policies

in order to organize their electronic information sharing with MOHESR. Moreover, the legislation and policies can decrease the staff's risks and fears while sharing the university's information with the ministry. Therefore, legislation and policies can make the staff more comfortable in sharing the information electronically.

Based on these findings, it can be argued that policy/ legal framework can increase the electronic information sharing among public universities and the ministry. Therefore, in order to increase electronic information sharing between them, it might be useful to build a good environment of legislation and policies between the universities and MOHESR. Therefore, it is necessary for the ministry to create legislation and policies based on their requirement and the public universities' needs. Moreover, these legislations and policies need to be understandable and easy to follow by the staff of each side.

6.2.3.13 Interagency Trust

In this study, the influence of interagency trust factor was found to be significant (β= .457, p = .000). Public universities believe that a high level of trust with MOHESR can increase the electronic information sharing. The trust between staff of public universities and MOHESR will provide a positive impression. Trust in electronic information sharing increases the participant and collaboration. Based on the findings, public universities and ministry have a high level of mutual trust. However, public universities should protect their staff while sharing their information in order to support them which can increase the sharing information electronically.

Based on these findings, interagency trust can increase the electronic information sharing among public universities and the ministry. Therefore, in order to increase electronic information sharing between them, it might be useful to build a good environment of trust between the universities and MOHESR. Moreover, the MOHESR should build this trusted environment between its employees and the public universities. However, it is necessary from the public universities to protect their employees when they share their information electronically with MOHESR.

6.2.3.14 Upper-level leadership

The effect of upper-level leadership was found to be significant (β= .239, p = .000). Therefore, the hypothesis of this factor was found supported. Based on the findings, upper-level leadership (MOHESR) needs to provide information to public universities regarding the advantage and disadvantage of electronic information sharing. MOHESR should make request and recommendations to the public universities about sharing their information electronically with them.

Based on these findings, it can be argued that upper-level leadership can increase the electronic information sharing among public universities and the ministry. In one hand, in order to increase electronic information sharing between them, it might be useful that MOHESR makes order to the public universities to encourage them to share their information electronically. In another hand, it should be noted that the MOHESR carefully considered the requests and recommendations as the most important initiatives while sharing the information electronically with MOHESR in order to not influence the universities decisions (to support the decentralization principle for the

public universities). Moreover, the public universities must know and understand the advantage and disadvantage of electronic information sharing.

6.2.3.15 Critical Mass

The critical mass results did not support the hypothesis in this study (β= .110, p = .076). This is linked with Akbulut (2003, 2011), which stated that the critical mass did not have an influence on electronic information sharing. The reason is agencies might not be aware of whether other local agencies share information electronically. Logically, agencies that are unaware of the actions of others are not likely to be influenced by those actions. Moreover, the study of Bigdeli (2012) suggested that critical mass did not influence the decisions of the departments in order to increase the participant in the electronic information sharing. Therefore, a university is not encouraged to increase its electronic information sharing based on the sharing of other universities.

The critical mass factor might influence public universities to increase the electronic information sharing with MOHESR. For example, the public universities which have successfully participating in electronic information sharing with MOHESR should be identified and announced by MOHESR for every university. Thus, this can encourage the non-participant public universities to start share. On another hand, it can encourage the participant public universities to increase their sharing. Moreover, these public universities could use the critical mass in order to encourage staffs (who are non-electronic participating) to participate in electronic information sharing.

6.2.3.16 Social Network

The results suggested that social network factor have an effect on public universities' participation (β= .351, p = .000). Based on the findings, public universities and ministry of higher education and scientific research have a good social network (relationship). Thus in order to increase the sharing of information electronically, the public universities' employees should have a better relationship with MOHESR employees. However, there is high concept of commitment and loyalty between the public universities' and the ministry employees. The social network is important in order to increase the electronic information sharing at the earlier stage of electronic sharing.

Based on these findings, it can be argued that relationship between staffs can increase the electronic information sharing among public universities and the ministry. These relationships can be like; friendship, colleagues, relatives, peers, workmates and so on. Therefore, it is necessary for the ministry to create social relationship environment between participants in order to increase electronic information sharing between them. It might be useful to build a better relationship environment among the participants by interviews, meetings, training, conferences, workshops, seminars, as well as webcam conversation. These social and work relationships need to take place with the greater level of commitment and loyalty on both sides, that is, between the universities' employees and MOHESR employees in every levels and position.

6.3 Contributions of Study

This study has made some practical and theoretical contributions as discussed in the next subsections.

6.3.1 Theoretical Contribution

In general, extensive reviews of relative research on electronic information sharing among government organizations (horizontal and vertical) are limited. Thus, this study extends the electronic information sharing studies in order to provide more understanding about it in the public sector. In particular, best on the researcher knowledge, so far there is no academic research being conducted in addressing the increasing of electronic information sharing participation between the higher education sector (public universities) and (a ministry). Therefore, this research addressed this existing research lacuna, by determining significant factors and further developing a theoretical model of electronic information sharing participation higher education sectors in Iraq; that is the sharing between the Iraqi public universities and MOHESR. The following highlights are the theoretical contribution of this research:

- **Technology Organization Environment Framework**

The technology, organization, and environment framework has been utilized widely in the information technologies and information systems studies in order to provide more explanation and understanding to the factors that influence the adoption of information technologies and inter-organizational information systems. However, TOE framework has been used before in the electronic government study (Akbulut, 2011). This shows that there is room to further expands the use of the theory in another perspective. Therefore, this research used the benefits of the TOE framework by adopting it in order

to add new characteristic named; electronic information sharing characteristic. Moreover, size factor has been investigated from this framework. This factor has not supported the increment of electronic information sharing between public universities and MOHESR in Iraq.

- **Transactive Memory System Theory**

Data warehouse as a factor has been utilized in this study base on the Transactive Memory System Theory. According to Akbulut (2003, 2011), the data warehouse can increase the electronic information sharing by giving the authorized staff indirect access to the information. Moreover, the central information systems that use common data storage (*e.g.*, data warehouse) help the organizations in increasing information sharing among them (Yang, Zheng, & Pardo, 2012). However, there are still insufficient studies on the use of data warehouse as a factor in increasing the participation of electronic information sharing, especially in the sector of higher education institution. Therefore, this study expanded the research areas in the use of the data warehouse by investigating it as one factor that influences electronic information sharing in the higher education sector in Iraq. As a result, data warehouse has been found to have a positive effect in increasing the electronic information sharing among the public universities and MOHESR.

- **Social Exchange Theory**

From the Social Exchange Theory, this study was based on two aspects (power and trust). From the aspect of power, this study found two different levels of power (from the Ministry and from the University). Therefore, upper-level leadership factor refers to the influence of ministry power, which was found as the affected factor to increase

the electronic information sharing in higher education sector. Moreover, Top management support factor refers to university influence power which also found supported the increment of electronic information sharing. Additionally, interagency trust factor refers to trust which has also influenced the increase of sharing information electronically among public universities and Ministry of Higher Education and Scientific Research. These factors can also contribute to improving the interaction, communication, relationship and sharing between the public universities and MOHESR.

Therefore, Social Exchange Theory has been found as supported in this study for the new context- public universities electronic information sharing initiatives. Moreover, this study provides more understanding about using this theory in the public universities (inter-organization information sharing) by investigating its factors into a research model electronic information sharing between public universities and MOHESR. This can show that this theory can be applied in electronic information sharing a higher education in a different environment or other government sector and contexts because a solid foundation for investigating its factors has been explained in this study.

- **Other Related Contribution**

This study provided a solid foundation by investigating the factors that influence the electronic information sharing in the public sector in general and higher education contexts in specific. These factors have been illustrated based on four barriers such as electronic information sharing, technology, organization and environment barriers of electronic information sharing in higher education sector. Information quality factor

has been found as an influencing factor in a qualitative research of electronic information sharing in UK conducted by Bigdeli (2012). Similarly, this study also found that information quality is significantly influencing electronic information sharing.

6.4 Practical Contribution

The findings of this study are important and relevant in an academic environment such as to Ministry of Higher Education and Scientific Research, policy makers, public universities, president, deans, IT managers' decision maker and the staff who share information electronically in these universities. Sharing information electronically by these entities can reduce the time, effort and costs of getting and collecting their information. Thus, electronic information sharing can support them to make better decisions. For example, information quality factor provides high-quality information which encouraging to share more information between the university's employees, managers, top managers, decision makers and policy makers in the universities. Thus, they will be more able to make their efficiency policies and effective decisions based on the university's situations.

Electronic information sharing between public universities and MOHESR has the ability to provide more efficiency in university operations and enhanced the services to the students and citizens. Additionally, it also higher education sector to provide more services to the private sector within good quality and suitable time. In general, therefore, it can add a significant contribution to the society.

Public organizations in any government have faced many technological, organizational, political and economic issues to electronic information sharing (Dawes 1996, Landsbergen and Wolken 2001, Akbulut, 2003, 2010; Jing and Pengzhu, 2007a, 2009; Bigdeli, 2012; Ouma, 2014). Thus, this study contributes to discovering these barriers. In this study, all the technological factors (IT capability, information quality, compatibility, complexity and data warehouse) have been found as bringing significant influence on the electronic information sharing in higher education sector. For instance, software, hardware and IT training to employees are critically needed in public universities. Therefore, public universities should increase their investment in software and hardware to enhance the communication channel with MOHESR and also they must give IT training to the staff in order to improve their IT skills. Moreover, software, hardware, and IT skills between public universities and MOHESR should be compatible. Thus, they should work together in order to make work out for the information sharing.

Additionally, the electronic information sharing has to be easy and friendly to use in order to encourage the employees use it and continue to do. Public universities have to be sure that their ways of sharing the information electronically with ministry are not complex. The increasing amount of information can be used to support the decision makers in these universities. Moreover, the decision makers should be aware on the quality of information shared, which will provide high-quality information for better decision-making processes.

Data warehouse is another significant factor to increase the electronic information sharing between public universities in Iraq and MOHESR. Thus, data warehouse platform can provide more amounts of information, high-quality information, integrated information, historical information and clean information. These kinds of information can be extremely useful to decision makers. Moreover, data warehouse tools such as data mining, OLAP, and decision support system can be utilized to provide knowledge, analysis and reports to support the decision makers of public universities and MOHESR in Iraq. The concept of common storage that data warehouse provides can contribute to increasing information sharing. In order to build a successful data warehouse platform huge collaborations from public universities and MOHESR are needed. The most important thing is that the access of data warehouse's information should be privileged based on employees' levels.

Policies and rules of MOHESR have been noticed as an important effect in this research. The respondents showed that they need policies and rules in order to make them more confidence while sharing their information electronically. Policies and rules should be created based on Ministry and public universities point of views. For example, the upper-level leaders (decision makers, policy makers, and top managers) in the MOHESR can use the information (e.g.,. requirements, requests, suggestions and needs) that come from universities in order to build their general policies, rules and decisions. Therefore, the MOHESR's policies, rules, and decisions will be better because they will be based on the universities' perspectives. Top managers in the public universities have been found in this study to influence the increasing of electronic information sharing by encouraging the staffs to share their information

with MOHESR. Therefore, top managers can use this power in order to support electronic information sharing.

The external effect on public universities (MOHESR effect) has been found as an important factor in this study. That means even with the decentralization principle of universities that MOHESR follows nowadays; the MOHESR still have a strong influence on its universities . Thus, the ministry can use such power in order to encourage the universities to increase the use of technologies to share their information. Trust factor has been found with high influence. Trust among employees in both sides also found with high influence on electronic information sharing. When the employees trust and believe that the information will not be lost or misused, then they will increase sharing them electronically. Trusted environment can contribute to making the employees more confident in electronic information sharing. Hence, public universities should provide a saved channel of sharing with ministry by building good security platform with MOHESR. Moreover, the relationship between staff (family, relative, peer, colleagues and friends) has been noticed as a supported factor. This study provides clear investigation about the need for a proper environment in order to increase the electronic information sharing between public universities and MOHESR. Iraq is one of the Arab countries, which has closed culture comparing to others. Thus, family, relative, peer, colleagues and friends have great influence on each person. Therefore, if any staff of university has a relationship with another staff in MOHESR that can make the communication and interaction easier especially by phone number or email. Therefore, MOHESR and public universities can create great relationship and good trust among their employees by making conferences, meeting, seminars, training, workshops, and so on, in order to know each other.

Generally, the findings of this quantitative study can be used to create different strategies in order to improve participation and usage of electronic information sharing in higher education sector in Iraq. Specifically, since the focus of this study is on the electronic information sharing between public universities and MOHESR. Thus the results could guide the planning of specific strategies and investment at both public universities and at MOHESR, to increase electronic information sharing among them. Ten factors have been determined to play some significance roles in increasing the participation of electronic information sharing. From the perspectives of *Technological characteristics*; universities and MOHESR can give priority in improving and upgrading IT capability, data warehouse, information quality, compatibility, and complexity. Both universities and the ministry can also look back onto their organizational as well as environmental elements. There could be a need to tighten up their policy/legal framework, leadership style, the social linkage or network, and trust in addition to getting strong support from top management as strategies to increase participation in electronic information sharing.

6.5 Future Works

This study provides more understanding and explanation of the influential factors that can increase the participation in electronic information sharing between public universities and the Iraqi Ministry of Higher Education and Scientific Research. In the future, more extended studies can be conducted as suggested below:

6.5.1 Geographical Extension for Research

Since the theoretical model is constructed by integration of literature developed into only five public universities in Iraq namely, Kufa, Babylon, Al-Qadysiah, Karbala and Al-Muthana. Therefore, it would be interesting to apply the same model to other public universities in order to see the similarity and difference between the results and relationship among the factors will change or not. Electronic information sharing between public universities and private sector was also not included in this research. Thus, it is a significant area of research for future studies. Future studies also could be replicated in different contexts using complementary samples to identify the boundary conditions of the theoretical framework.

6.5.2 Extension Study in Methodological Approach

From the data collection approach, the questionnaires in this study were distributed to the samples by the universities themselves, through the Department of Scholarships and Public Relations. The number of data collected totally depended on the cooperation of these entities. Future studies can use a different approach of data collection such as survey where a researcher can self-distribute the questionnaires in order to get a comprehensive response thus yields better results. An online method can also be applied but sometimes needs further follow up when the response is quite slow.

Moreover, top managers (presidents of the universities and the assistants) were not included in answering the questionnaires so a qualitative or mix method research such as an interview with the top management could be suggested in the future study in order to provide more understanding the electronic information sharing concepts in the higher education sector by them.

6.5.3 Extension Study in the Scope of Research

The scope of this research is totally on the universities' employees or staff who supposed to share information electronically with MOHESR. Thus, the questionnaires of this study were only distributed to the groups of staff who share the information electronically with MOHESR. The future work can extend the scope by involving both universities' staff who shares information electronically, and those who do not involve in sharing the information electronically in order to have more understanding.

The next study of electronic information sharing in the higher education sector can also focus on the ministry side. Views from the ministry's officers could give more information and can be compared with the findings from the universities' side. Horizontal electronic information sharing study in the higher education sector is also needed such as study of electronic information sharing among the ministry's directorates and also a study of electronic information sharing between university's departments.

A similar study can also be conducted in other countries to see how information is shared electronically in the different higher education system and what influential determinants are. That is to say, some situations that exist in one country may not exist in another country, or may not exist in the same way or to the same degree in the country; or the meaning of a concept in one country may not mean the same thing in another country; what works in one country may not work in the other country.

6.5.4 Additional Factors

An important avenue for a future work involves investigating the factors that influence electronic information sharing among government organizations. Thus, many factors may counteract when information is being shared among organization at the same level (horizontal) (such as local to local or central to central electronic information sharing) or when it is being shared between different levels of government organizations (vertical) (such as central to local or local to central electronic information sharing). The factors that can increase the electronic information sharing might change based on the type of the public sectors involved in the electronic information sharing: for example, sharing of information between the organization that belongs to the ministry of higher education, and the public universities.

Moreover, in this study, all the technological factors has been found as supported. Thus, it is useful to try to discover more technological factors such as, connectivity, IT technical support, awareness in IT and resistance to change. Finally, mobile and web applications, and social media need to be investigated in order to find their influence on electronic information sharing.

6.5.5 Data Warehouse

This study found the positive effect of the data warehouse as a factor to increase the electronic information sharing in higher education sector. Thus, different technologies need to research such as cloud computing, data mart, and even a big data. However, the employees in public universities might not have a good knowledge of data warehouse. Therefore, data warehouse as a factor needs to be researched by the experts of the data warehouse in order to understand and examine more of its effect on

increasing the electronic information sharing. Moreover, data warehouse as factor needs to be applied in electronic information sharing studies in different environments such as Ministry of Health and Ministry of Municipalities. Finally, the tools and concepts of data warehouse should be studied in order to illustrate and understand which tools and concepts of the data warehouse can share the information.

6.6 Conclusion

This research investigated the influential factors that can increase the participation of electronic information sharing between Iraqi public universities and the Ministry of Higher Education and Scientific Research. Based on the analysis of the literature of intra-organizational electronic information sharing and well-established theories such as Transactive Memory System Theory, Critical Mass Theory and Social Exchange Theory, sixteen hypotheses have been developed. The research model was developed based on TOE framework which identified based on the interview. Moreover, hypotheses are backed up from the previous studies to propose research model. The relative studies were analyzed to address the research questions under investigation. The study involved analysis of questionnaires that were collected from the public universities to statistically test the theoretical model and hypotheses of the research.

The results refer to numbers of electronic information sharing, technological, organizational and environmental factors that can increase the electronic information sharing among public universities and MOHESR. There are ten supported factors in this study namely; IT capability, information quality, compatibility, complexity, data warehouse, top management support, policy/legal framework, interagency trust, upper-level leadership and social network. Moreover, the study identified six

unsupported factors namely benefits, risks, costs, collaboration, size, and critical mass. Thus, the research has a number of theoretical and practical contributions.

This research contributes to extending the knowledge in the public information systems, IT adoption, intra-organizational electronic information sharing, e-services, e-government and e-governance in the public sector. The findings of the research are essential and relevant to the Ministry of Higher Education and Scientific Research, public universities, IT managers, policy makers, top managers and decision makers of these universities. It also contributes to adding huge benefits to the students and society. Moreover, this study contributes to technological aspect with the findings of the data warehouse as one factor to increase the participation of electronic information sharing in higher education sector. Thus, the data warehouse factor has found to be a supporting factor to increase the participation of electronic information sharing between the Iraqi public universities and MOHESR.

Based on the results of this study, list of factors have been identified and model of electronic information sharing between Iraqi public universities and MOHESR have been finally proposed, These findings give a high contribution to both the ministry and universities' in terms of planning and implemented high-impact strategies; from the technological aspects, as well as from the organizational and environmental aspects in order to increase the participation and usage of electronic information sharing among them. The increment of information in the universities can help and support their decision makers in order to make better decisions. Thus, the ability of making a better decision can provide a good environment which supports the universities to make better, quality and fast decision on their own.

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APPENDIX A

Interview Questions

The main purpose of this research is to identify the type of information that shared between in MOHESR and public universities and also to illustrate the barriers that Higher Education sector face while sharing these information. Moreover, the interview also need to proof the sixteen electronic information sharing factors that can increase the share of information electronically between MOHESR and public universities.

Name: Dr. Ghassan Wasfi Mohammed
Email: ghanm1971@yahoo.com
Mobile: 009647722502452
Age: 45
Gender: Male
Position: Computer center in MOHESR
Education level: PhD
Background: Information Technology

1-To what extent are the following types of communication used by your Ministry to share information electronically with public universities?Please tick the answer (√). You can choose more than one answer.

Communication Type	(√)
Phone line/ Mobile	✓
Email	✓
Websites	✓
Webcam	x exsist but not used
Shared Databases	x
Other communication (Please add)	CD or DVD

2-What is the status of electronic information sharing MOHESR and public universities in Iraq?Please tick the answer (√).

University	Status of electronic sharing with MOEHSR		
	Poor	Moderate	Good
University of Kufa		✓	
University of Babylon		✓	
University of Al-Qadisiyah	✓	xxx	
University of Karbala		✓	
University ofAl-Muthanna	✓		

3- How frequently do you use these devices to share the information?Please tick the answer (√). You can choose more than one answer.

Electronic device	Never use	Less than one time in a month	Once a month	few times a month	few times a week	Few times a day
Mobile phone					✓	
Email					✓	
Websites				✓		

Webcam		✓				
Shared Databases	✓					
Other devices (Please add)		✓				

4-Approximately what is the percent of all information shared electronically between your Ministry and public universities?

0% [ ] 1-20% [ ] 21-40% [ ] 41-60% [ ] 61-80% [✓] 81-100% [ ]

5-Approximately how long has your Ministry been sharing information electronically with public universities?

0 [ ] <1 Year [ ] 1--3 Years [ ] 4-6 Years [ ] 7-9 Years [✓] 10+ Years [ ]

6- Describe the types of information (e.g. student information, staff information, Policies and Rules, etc.) that your Ministry shares with public universities.Please tick the answer (√). You can choose more than one answer.

Types of information	Percentage of Sharing Electronically					
	0%	1-20%	21-40%	41-60%	61-80%	81-100%
Student information					✓	
Administrative staff information				✓		
Academic staff information					✓	
Guidelines and suggestions				✓		
Dispatches					✓	
Scholarships and studies				✓		
Policies and rules					✓	
Guidelines				✓		
Other types of information (Please add)						

7-Do you think that Ministry of Higher Education willing to increase the electronic information sharing between Ministry and its public university?

Yes [✓] No [ ]

8-Do you think that Ministry of Higher Education can develop a common storage concept (such as Data Warehouse technology) in order to increase the electronic information sharing between Ministry and the public university?

Yes [✓] No [ ]

9-What are the barrier that affectthe electronic information sharing between MOHESR and public universities?

University	Barriers of sharing information electronically			
	Electronic information sharing	Technological	Organizational	Environment
	/	/	/	/
all the universities				

10-What are the factors that affected your Ministry to share information electronically with its public universities?

Top manager, I.T capability, Trust, Policies, Compatibility, Information Quality, multi database issues such as different format and software

11-1 Benefits

What are the benefits for your Ministry to participate in sharing the information electronically?

speed up, accuracy, cost of document, time, reduce the cost, reduce the corruption, ease the process

11-2 Costs

What are the costs for your Ministry to participate in sharing the information electronically?

~~There's~~ It will not cost alot because we already have the computers & software & Stuffs

11-3 Risks

What are the risks for your Ministry to participate in sharing the information electronically?

there are no much risk in using E-LS

11-4 IT Capability

A- How much of your Ministry operations are computerized?

We have computers enough

B- How many IT people do you have?

we need IT staff to fix the problem

11-5 Information Quality

A- Do you think data quality can be considered as a vital factor influencing Electronic Information Sharing?

It is very important and we need it

B- Dose the current information has the quality to be shared Public Universities and MOHESR?

There are many mistakes with universities information

11-6Compatibility

A- Is it important to have IT compatible (software, hardware and IT skills) between public universities and MOHESR?

It is important to have compatibity between us in the universities

B- What is the current situation of IT compatibility between public universities and MOHESR?

There is no such thing, still we need to compatabil between us.

11-7 Complexity

A- Do you think that sharing information electronically is an easyprocess?

It is not ucomplex it is easy

B- What are the difficult concepts of sharing the information electronically with public universities?

There is no real GIS project we still in the sample concept

11-8 DataWarehouse

A- Do you think that, store public universities and MOHESR information in common storage (data warehouse) can increase the electronic information sharing?

Sure, it can increase electronic information Sharing

B- What are the challenges that Ministry face if the planned to share their information by using data warehouse?

IT staffs cost, hard ware, software, Top manager

11-9 Top Management Support

A- Do you think that the top manager in the public universities can increase the participation of electronic information sharing with Ministry by encourage the university staff?

everything belong to them so they should believe in that

B- In your opinion, what are the things that top managers in public universities can do in order to encourage their staff to share the university's information electronically with MOHESR?

by giving training letter of thanks for participant or incentive

11-10 Collaboration

Electronic Information sharing project can be success by collaborate the ministry and public universities together, what do you think?

We should collaborate between us. But most of the responsibility belong to the Ministry.

11-11 Size

A- Do you think the size of your public university can increasethe electronic information sharing?

sure, because the big university will have more staff, students and experience

B- Do you think that big number of information system and IT skills can increase the electronic information sharing?

Sure. The IT skill and computer can effect

11-12 Policy/Legal Framework

A- Do you think that rules and laws are important to protect the participants while share their information electronically?

we need rules and laws by sure.

B- What are the rules that MOHESR made to protect the staff while using the ICT devices to share their information electronically?

we do not have yet

C- If there are rules, do you thing that these rules are enough to protect and encourage the public universities employees to share their information electronically with MOHESR?

11-13 Interagency Trust

A- Are there any issues of trust between your Ministry and the public universities in receiving the information and using it?

yes we have trust because universities belong to ministry and it is government sector (no competition)

B- Do the Ministry and public universities' employees trust the sharing their information electronically?

There is trust but it is not enoug because it is depend on the employee.

11-14 Upper level Leadership

A- What is the level of control that MOHESR has on its public universities?

Yes sure, the MoHESR hows hug control

B- Do you think that MOHESR has positive or negative influence on public universities which can affect the electronic information sharing between them?

MoHESR has positive influence on public universities

C- Does Ministry of Higher Education have a role to order or request the public universities to share their information electronically?

It is depend in some time the Ministry give orders and sometimes the request is enough

11-15 Critical Mass

Do you think that the number of universities participating in electronic information sharing can affect or encourage the participation of other universities?

yes it can encourage other universities

Are the public universities willing to increase the number of information that share electronically with MOHESR?

yes the universities are willing to do that

11-16 Social Network

A- What are the relationships between employees in MOHESR and public universities?

there are normal relationships between us

B- Do the Employees in MOHESR and public universities have a good relationship?

yes their relationship is good between us

C- Do you agree that the relationships between employees in both sides can increase the trust among the staff in higher education sector?

yes it can increase the e/s because it increas the trust.

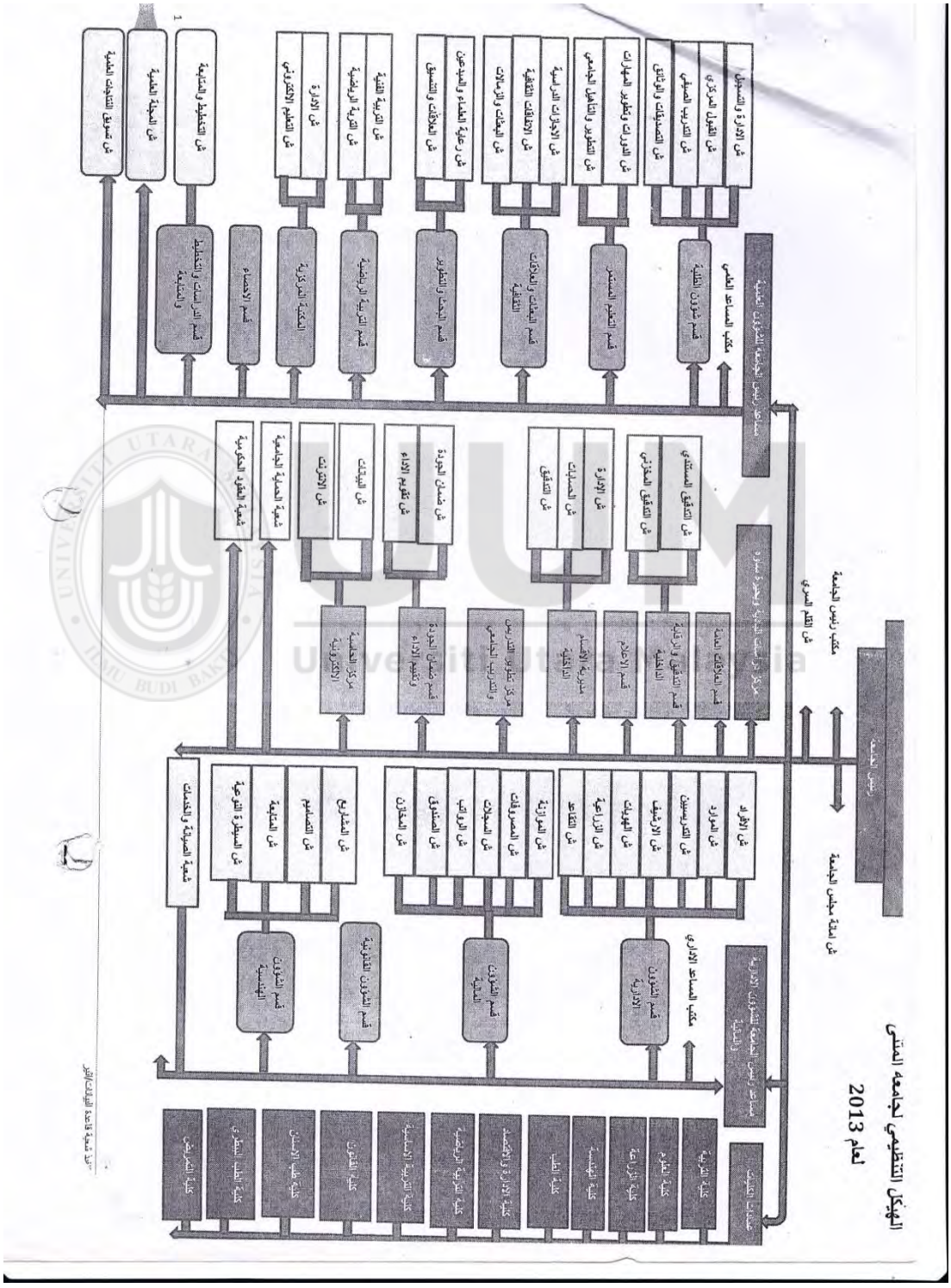
D- Is the relationship between the employees (relative, friends, mates and so on) effect the participation of sharing information electronically between public universities and MOHESR?

yes it can effect positively.

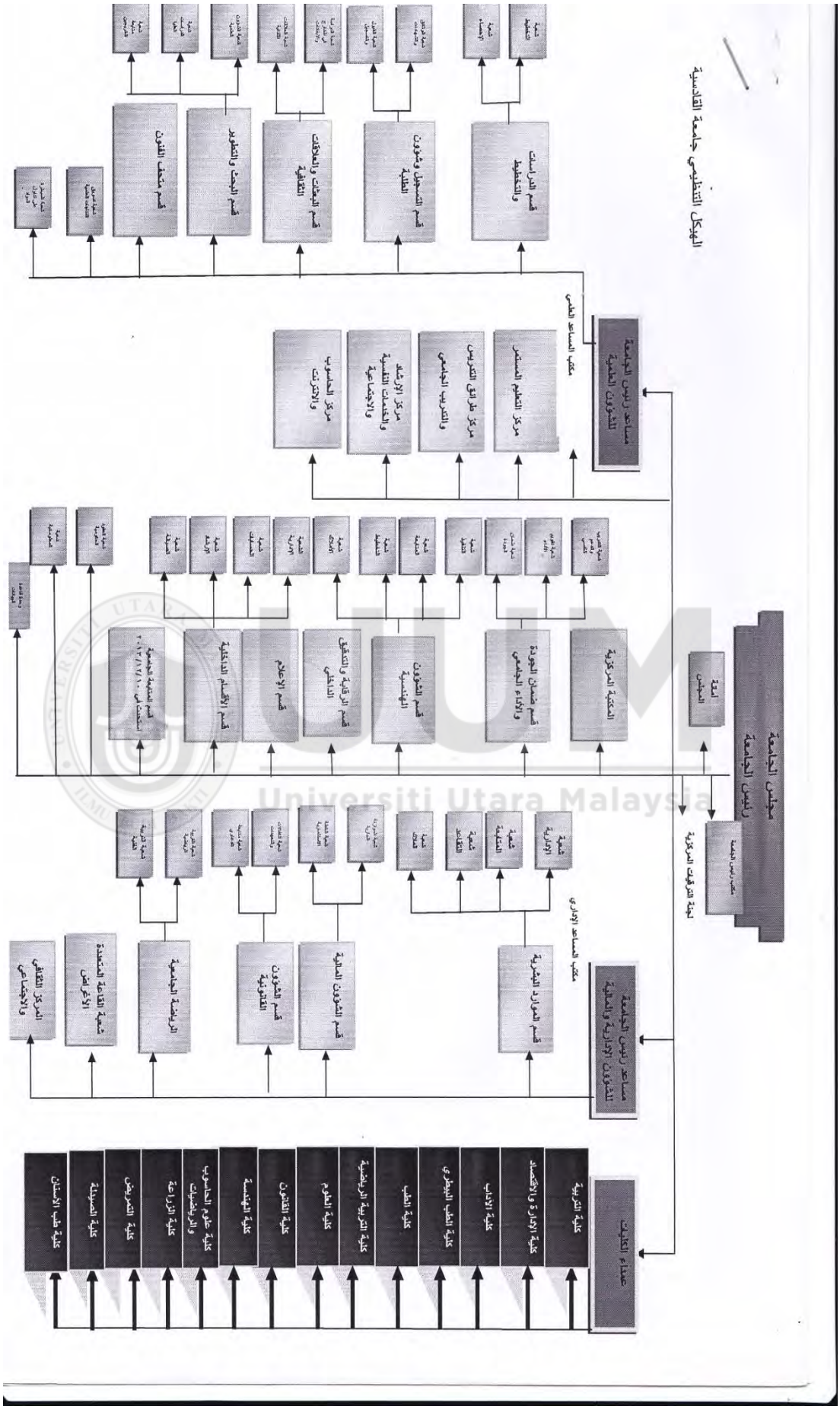
12- Do you have any thing that you would like to add or make it more understandable?

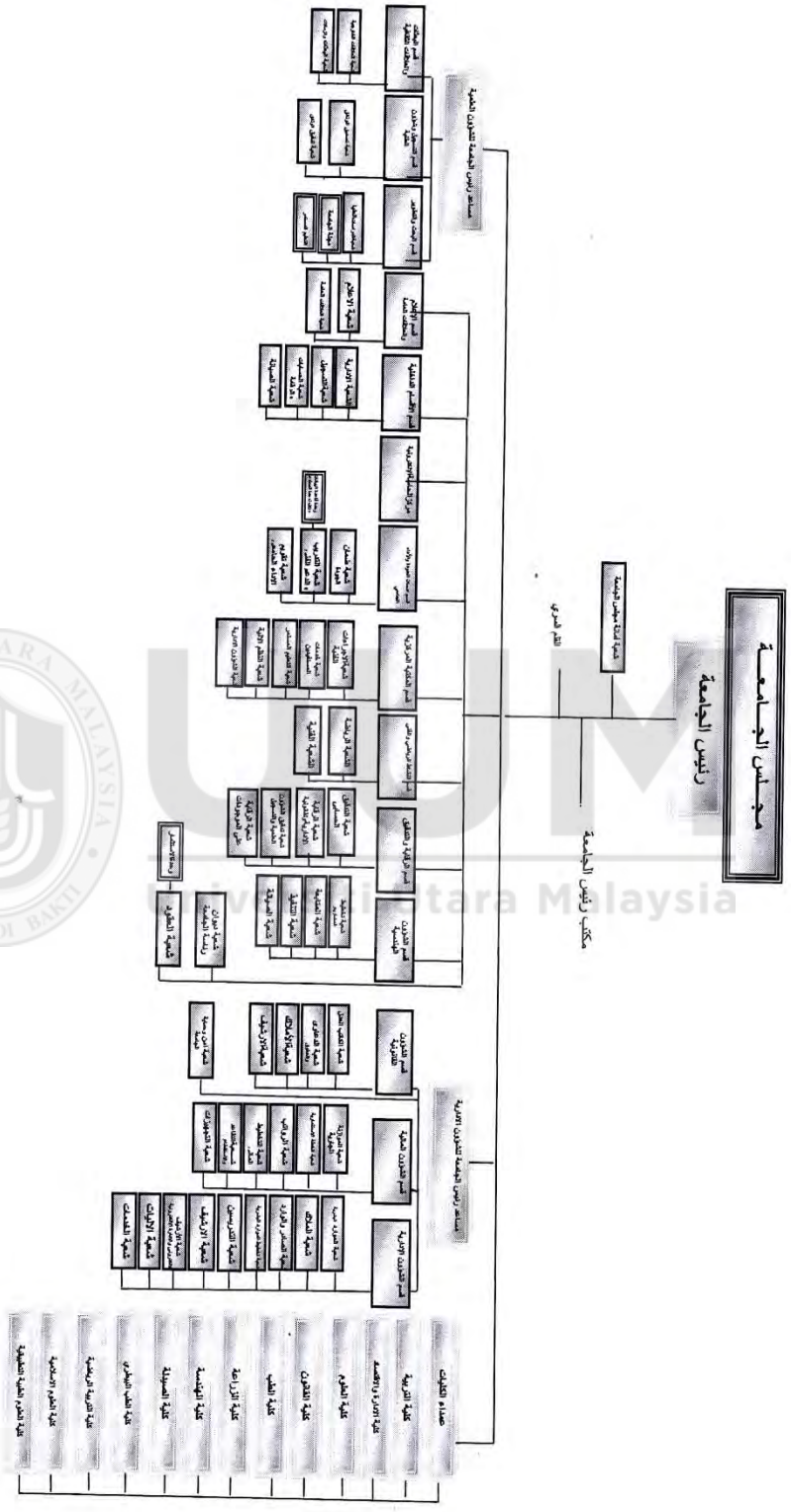
APPENDIX B

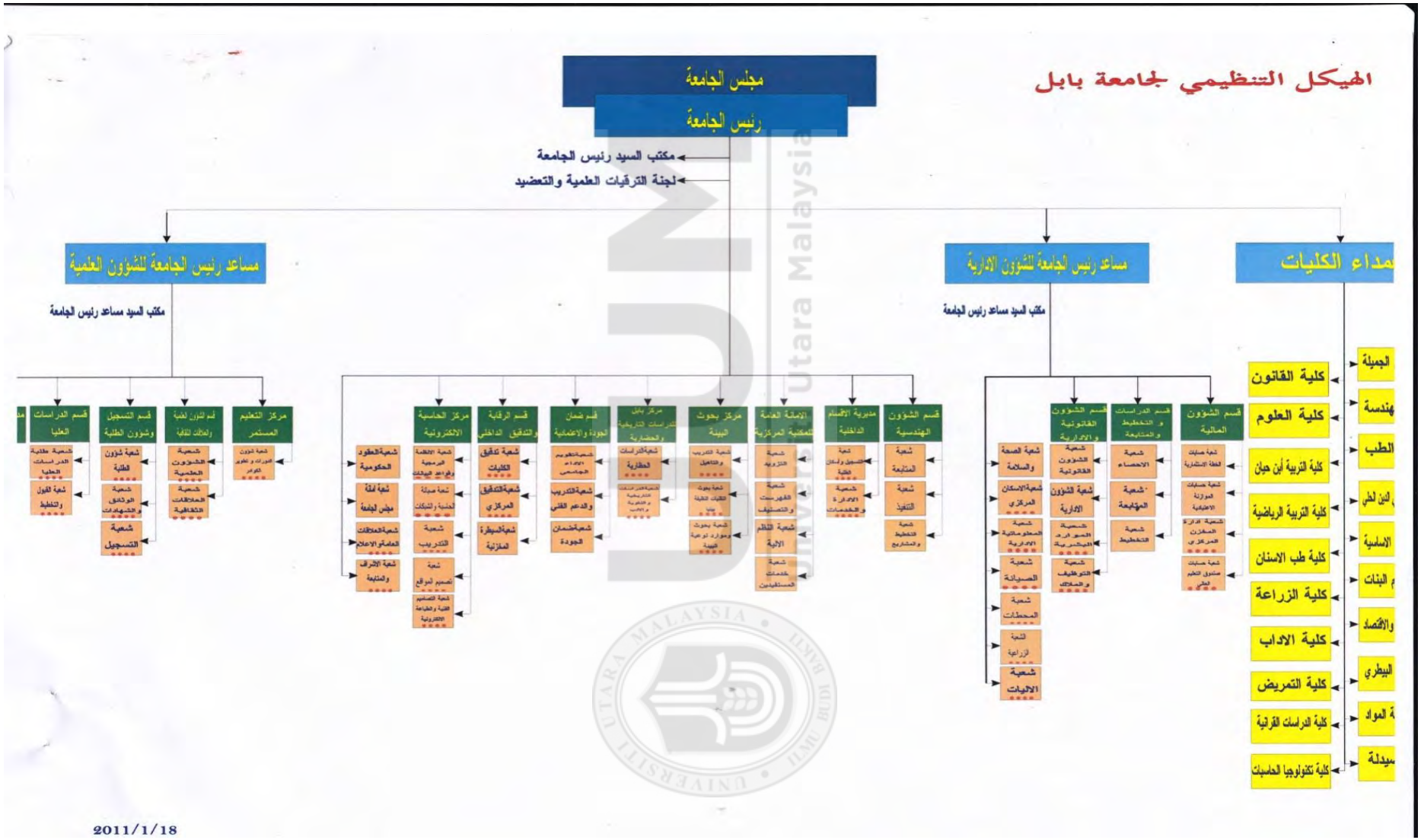
ORGANIZATION STRUCTURE OF THE UNIVERSITIES

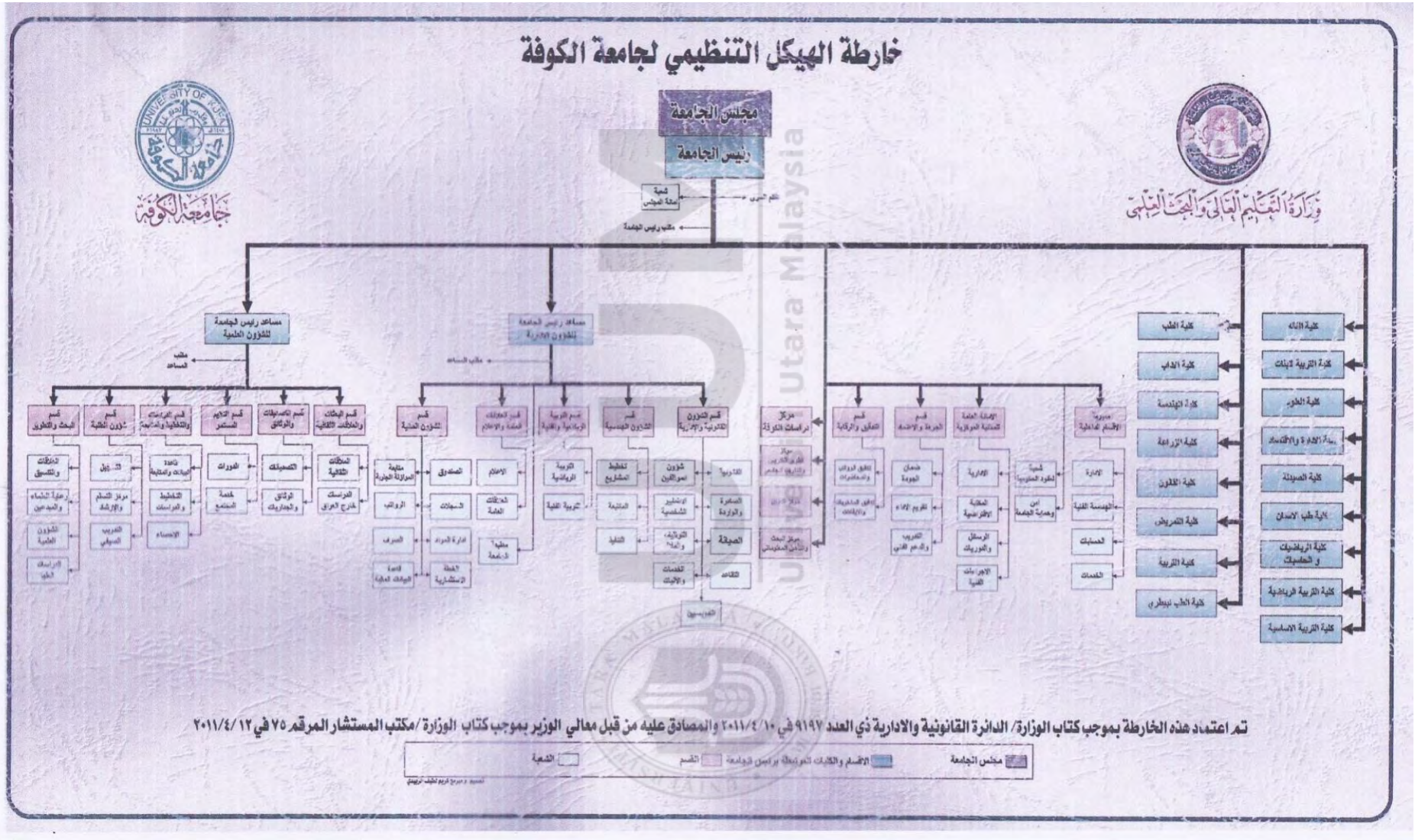


الهيكل التنظيمي جامعة القادسية






الهيكل التنظيمي لجامعة بابل
مجلس الجامعة
رئيس الجامعة
مكتب السيد رئيس الجامعة
لجنة الترقيات العلمية والتضيد
مساعد رئيس الجامعة للشؤون العلمية
مكتب السيد مساعد رئيس الجامعة
مساعد رئيس الجامعة للشؤون الادارية
مكتب السيد مساعد رئيس الجامعة
عمداء الكليات
كلية القانون
كلية العلوم
كلية التربية أبن حيان
كلية التربية الرياضية
كلية طب الاسنان
كلية الزراعة
كلية الاداب
كلية التمريض
كلية الدراسات القرآنية
كلية تكنولوجيا الحاسبات
الجميلة
هندسة
الطب
الاساسية
البنات
والاقتصاد
البيطري
المواد
صيدلة
قسم الشؤون الهندسية
مديرية الاقسام الداخلية
الامانة العامة للمكتبة المركزية
مركز بحوث البيئة
مركز بابل للدراسات التاريخية والحضارية
قسم ضمان الجودة والاعتمادية
قسم الرقابة والتدقيق الداخلي
مركز الحاسبة الالكترونية
قسم الدراسات العليا
قسم التسجيل وشؤون الطلبة
قسم الدورات لغاية واعادات لثقافة
مركز التعليم المستمر
قسم الشؤون المالية
قسم الدراسات والتخطيط والمتابعة
قسم الشؤون القانونية والادارية
شعبة الصحة والسلامة
2011/1/18


خارطة الهيكل التنظيمي لجامعة الكوفة
جامعة الكوفة
وزارة التعليم العالي والبحث العلمي
مجلس الجامعة
رئيس الجامعة
أمانة المجلس
مكتب رئيس الجامعة
مساعد رئيس الجامعة للشؤون العلمية
مساعد رئيس الجامعة للشؤون الادارية
مكتب المساعد
كلية الطب
كلية الاداب
كلية الهندسة
كلية الزراعة
كلية القانون
كلية التمريض
كلية التربية
كلية الطب البيطري
كلية الفقه
كلية التربية للبنات
كلية العلوم
كلية الادارة والاقتصاد
كلية الصيدلة
كلية طب الاسنان
كلية الرياضيات و الحاسبات
كلية التربية الرياضية
كلية التربية الاساسية
تم اعتماد هذه الخارطة بموجب كتاب الوزارة/ الدائرة القانونية والادارية ذي العدد ٩١٩٧ في ٢٠١١/٤/١٠ والمصادق عليه من قبل معالي الوزير بموجب كتاب الوزارة /مكتب المستشار المرقم ٧٥ في ٢٠١١/٤/١٢
مجلس الجامعة
الشعبة

APPENDIX C

NAME OF THE DEPARTMENTS

اقسام رئاسة جامعة كربلاء

البحث والتطوير	المجلة
التعليم المستمر	التسجيل وشؤون الطلبة
ضمان الجودة	المساعد الاداري
المكتبة المركزية	المهارات
الاقسام الداخلية	مركز الحاسبة
المالية	الادارية
الرقابة والتدقيق الداخلي	مكتب رئيس الجامعة
امانة مجلس الجامعة	القانونية
الشؤون الهندسية	شعبة الصيانة
مختبر اللغة الانكليزية	الاعلام والعلاقات العامة
شعبة المتابعة	الترقيات

APPENDIX D

OFFICIAL LETTERS

Date: 2nd April 2014

To whom it may concern

DATA COLLECTION AND SAMPLING

Mohammed Abdulameer Mohammed (Passport no. A6332037) is a PhD student of Universiti Utara Malaysia, Malaysia. Under my supervision, he is doing a study on Iraqi public universities regarding *Electronic Information Sharing between Iraqi Public Universities and, Ministry of Higher Education and Scientific Research.* As a part of completing his study, he needs to do data collection from the public universities.

Kindly please give your full assistance and support to him in conducting data collection from your institution.

Thanks for your cooperation.

(ASSOC. PROF. DR. HUDA IBRAHIM)
Dean
School of Computing
Uum College Of Arts And Sciences
Universiti Utara Malaysia

ASSOC. PROF. DR. HUDA HAJI IBRAHIM
Dean
School of Computing
UUM College of Arts & Sciences
Universiti Utara Malaysia

السيد المستشار الثقافي المحترم

23-04-2014

م/ تسهيل مهمة

تحية طيبة

اني محمد عبدالأمير محمد البو باقر صاحب جواز السفرالمرقم (A6332037) مرشح لنيل شهادة الدكتوراة من جامعة اوتاراة الماليزية على نفقتي الخاصه وبحثي في مجال تقنية المعلومات في بيئة التعليم الجامعي وعنوان اطروحتي هو:

"تبادل المعلومات الالكترونية بين الجامعات الحكومية العراقية و وزارة التعليم العالي والبحث العلمي لدعم مبدأ اللامركزية"

لذلك اني اتقدم بطلبي هذا كي انال موافقتكم على:-

أ. توزيع استبيان دراستي على موظفي رئاسة جامعة الكوفة, بابل, القادسية, كربلاء و المثنى.
ب. الحصول على عدد الموظفين العاملين بتلك الرئاسات لانهم عينة بحثي.
ت. الحصول على المخطط التنظيمي لهذه الجامعات الخمسة.

مع فائق الشكر والتقدير

محمد عبدالامير محمد البوباقر

مرشح لنيل شهادة الدكتوراة من جامعة UUM

mhmdaldbagh@yahoo.com

+9647801280088

+60149035750

23-04-2014

Embassy of the Republic of Iraq
Cultural Attaché - Kuala Lumpur

سفارة جمهورية العراق
الدائرة الثقافية - كوالالمبور

ممثلية وزارة التعليم العالي والبحث العلمي العراقية في ماليزيا
Representative of the Iraqi Ministry of Higher Education and Scientific Research (MOHESR) in Malaysia

No : 1228
Date : 28/ 4 /2014

العدد : ١٢٢٨
التاريخ : ٢٨/ ٤ / ٢٠١٤

الى /وزارة التعليم العالي والبحث العلمي/ دائرة البعثات و العلاقات الثقافية
قسم شؤون الدارسين في الخارج / الوطن العربي و آسيا

م/ تسهيل مهمة

تحية طيبة

نحيل اليكم الطلب المقدم من قبل طالب النفقة الخاصة السيد **محمد عبد الامير محمد** الذي يدرس للحصول على شهادة الدكتوراه في اختصاص **تقنية المعلومات** من جامعة **UUM الماليزية** ، والذي يروم فيه مفاتحة دائرتكم الموقرة لغرض مخاطبة عدد من الجامعات العراقية لتسهيل مهمة بتوزيع استبيان دراسته على موظفي رئاسات الجامعات التالية (جامعة بابل و جامعة الكوفة و جامعة كربلاء و جامعة المثنى) و كما ورد في طلبه المرفق وجامعة الغارسية .

للتفضل بالإطلاع ... مع التقدير

المرفقات:
- طلب الطالب.
- كتاب المرشف.

أ.د. حسن هاشم سلمان
المُستشار الثقافي
٢٠١٤/٤ /

نسخة منه:
- ملف الطالب.
- الصادرة.

حزة

Address: Unit 5.07 Level 5 North Block Ampwalk 218 Jalan Ampang Kuala Lumpur 50450 Malaysia
Tel: 0060 3216 30741 **Website:** Iraqculturalattache-my.org **Email:** culturalofficemalaysia@yahoo.com **Fax:** 0060 3216 30742

Embassy of the Republic of Iraq
Cultural Attaché - Kuala Lumpur

سفارة جمهورية العراق
الدائرة الثقافية - كوالالمبور

ممثلية وزارة التعليم العالي والبحث العلمي العراقية في ماليزيا
Representative of the Iraqi Ministry of Higher Education and Scientific Research (MOHESR) in Malaysia

No : ١٦٠٠
Date : 3/ 6 /2014

العدد : ١٦٠٠
التاريخ : ٣/ ٦ / ٢٠١٤

الى /وزارة التعليم العالي والبحث العلمي/ دائرة البعثات و العلاقات الثقافية
قسم شؤون الدارسين في الخارج / الوطن العربي و آسيا

م/ تسهيل مهمة

تحية طيبة

ألحاقاً بكتابنا المرقم ١٢٢٨ في ٢٨ / ٤ / ٢٠١٤ ،

نحيل اليكم الطلب المقدم من قبل طالب النفقة الخاصة السيد **محمد عبد الامير محمد** الذي يدرس للحصول على شهادة الدكتوراه في اختصاص **تقنية المعلومات** من جامعة **UUM الماليزية** ، والذي يروم فيه مفاتحة دائرتكم الموقرة لغرض مخاطبة عدد من الجامعات العراقية لتسهيل مهمته بتوزيع استبيان دراسته على موظفي رئاسات الجامعات التالية (جامعة بابل و جامعة الكوفة و جامعة كربلاء و جامعة المثنى و جامعة القادسية) و كما ورد في طلبه المرفق .

للتفضل بالإطلاع ... مع التقدير

أ. د. حسن هاشم سلمان
المُستشار الثقافي
٢٠١٤/٦/٣

المرفقات:
- طلب الطالب.
- كتاب المرشف.

نسخة منه:
- ملف الطالب.
- الصادرة.

حمزة

Address: Unit 5.07 Level 5 North Block Ampwalk 218 Jalan Ampang Kuala Lumpur 50450 Malaysia
Tel: 0060 3216 30741 **Website:** Iraqculturalattache-my.org **Email:** culturalofficemalaysia@yahoo.com **Fax:** 0060 3216 30742

APPENDIX E

MINISTRY'S OFFICIAL LETTER

بسم الله الرحمن الرحيم

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
دائرة البعثات والعلاقات الثقافية
قسم شؤون الدارسين في الخارج/الوطن واسيا

وزارة التعليم العالي والبحث العلمي
Ministry of Higher Education & Scientific Research

١٧٦٩٢
العدد: ص ب /١٤/
التأريخ: / /٢٠١٤
٦ ٥

الى/ الجامعات
جامعة بابل
جامعة الكوفة
جامعة كربلاء
جامعة المثنى
جامعة القادسية
م/ احالة

تحية طيبة..

نحيل اليكم كتاب دائرتنا الثقافية في ماليزيا المرقم ١٦٠٠ في ٢٠١٤/٦/٢ بخصوص طلب طالب النفقة الخاصة في ماليزيا السيد **محمد عبد الامير محمد** و الذي يروم مخاطبة عدد من الجامعات العراقية لتسهيل مهمته

- توزيع استبيان دراسته على موظفي رئاسات الجامعات التالية (جامعة بابل و جامعة الكوفة و جامعة كربلاء و جامعة المثنى و جامعة القادسية) و كما ورد في طلب الطالب.
- الحصول على عدد الموظفين العاملين بتلك الرئاسات لانهم عينة بحثه.
- الحصول على مخطط التنظيمي لهذة الجامعات

للتفضل بالاطلاع و اعلامنا بما جاء بطلب الموما اليه ... مع التقدير

المرفقات:
كتاب الدائرة الثقافية في ماليزيا

د. صادق عامر ابونايلة
مدير قسم شؤون الدارسين في الخارج
٢٠١٤/٦/ ٤

نسخة منه إلى //
- مكتب السيد المدير العام/ للتفضل بالاطلاع... مع التقدير
- قسم شؤون الدارسين في الخارج / الوطن العربي / نفقة/ ماليزيا

محمد باقر ٦/٤//

موقع دائرة البعثات والعلاقات الثقافية: Website: www.Scrdiraq.com
الدائرة: E-mail: scrd@mohesr.gov.iq ايميل

APPENDIX F

QUESTIONNAIRE SUBMISSION

University of Babylon (Um Zaid, 009647801177576)

University of Al-Qadysih (Dr. Mohammed Hamzah, 009647809181781)

University of Kufa (Dr. Mahssan, 009647811906256)

University of Karblaa (Mr. Ali Abood, 009647813213633)

APPENDIX G

DEPARTMENT'S OFFICIAL LETTER

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
جامعة كربلاء
البعثات والعلاقات الثقافية
شعبة البعثات والزمالات الدراسية

العدد ١٠١١
تاريخ ٢٠١٤/٦/١٧

الى/ اقسام الرئاسة كافة

م/ احالة

تحية طيبة:

نرفق لكم طياً نسخة من كتاب وزارة التعليم العالي والبحث العلمي/دائرة البعثات والعلاقات الثقافية/ قسم شؤون الدارسين في الخارج / الوطن واسيا المرقم ص ب/١٧٦٩٣/١٤ في ٢٠١٤/٦/٥ والخاص بطالب النفقة الخاصة في (ماليزيا) السيد (محمد عبد الأمير محمد) واشارةً الى هامش السيد المساعد العلمي المحترم يرجى التفضل بالأطلاع وتسهيل مهمته .

مع فائق الشكر والتقدير

أ.م.د. صباح واجد علي
مدير قسم البعثات والعلاقات الثقافية
٢٠١٤/٦/١٧

- نسخة منه الى//
- مكتب السيد المساعد العلمي مع التحية.
- البعثات والعلاقات الثقافية
- الحافظة
• مـ/ ١٧/٦

العراق – محافظة كربلاء – جامعة كربلاء – ص.ب ١١٢٥ – هـ ٣٢١٣٤٦
Iraq – Kerbala – P.O. Box 1125 – Ph 321346- Emil : Kerbala University @ hotmil.com

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
جامعة بابل
قسم البعثات والعلاقات الثقافية

Republic of Iraq
Ministry of higher education &
Scientific Research
University of Babylon
Department of Scholarships &
Cultural Relations

العدد: ١٦٧٩

التاريخ: ١١ / ٦ / ٢٠١٤

الى : اقسام ومراكز الرئاسة

م/ احالة

تحية طيبة:

نرافق لكم ربطا نسخة من كتاب وزارة التعليم العالي والبحث العلمي/ دائرة البعثات والعلاقات الثقافية المرقم بالعدد ص ب ١ ١٧٦٩٣١١٤ في ٢٠١٤/٦/٥ للتفضل بالاطلاع والاجابة على الاستبيان على ان تردنا اجاباتكم في موعد اقصاه يوم الاثنين ٢٠١٤/٦/١٦ راجين سرعة الاجابة ... مع الاحترام

المرفقات//

١-كتاب الوزارة
٢-استمارة استبيان

د. عصام محمد الجبوري
مديـــر القســـم
١١ / ٦ / ٢٠١٤

صورة منه إلى //
- مكتب السيد المساعد رئيس الجامعة للشؤون العلمية المحترم ... مع الاحترام .
- قسم البعثات والعلاقات الثقافية ... مع الأوليات
- الصادرة.

Address: Iraq, Babylon, University of Babylon
www.uobabylon.edu.iq

Tel: 009647601010637
Email:babil_elmeaa@yahoo.com

١٤/٠٦/١١

بسم الله الرحمن الرحيم

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
دائرة البعثات والعلاقات الثقافية
قسم شؤون الدارسين في الخارج/الوطن واسيا

١٧٦٩٢
العدد: ص ب /١٤/
التأريخ: /٦/ ٢٠١٤
٦ ٥

وزارة التعليم العالي والبحث العلمي
Ministry of Higher Education & Scientific Research

رئاسة جامعة الكوفة
الموارد
العدد: ٢١٨٩٢
التاريخ: ٢٠١٤/٦/٩

الى/ الجامعات
جامعة بابل
جامعة الكوفة
جامعة كربلاء
جامعة المثنى
جامعة القادسية
م/ احالة

تحية طيبة..

نحيل اليكم كتاب دائرتنا الثقافية في ماليزيا المرقم ١٦٠٠ في ٢٠١٤/٦/٢ بخصوص طلب طالب النفقة الخاصة في ماليزيا السيد **محمد عبد الامير محمد** و الذي يروم مخاطبة عدد من الجامعات العراقية لتسهيل مهمته

- توزيع استبيان دراسته على موظفي رئاسات الجامعات التالية (جامعة بابل و جامعة الكوفة و جامعة كربلاء و جامعة المثنى و جامعة القادسية) و كما ورد في طلب الطالب.
- الحصول على عدد الموظفين العاملين بتلك الرئاسات لانهم عينة بحثه.
- الحصول على مخطط التنظيمي لهذة الجامعات

للتفضل بالاطلاع و اعلامنا بما جاء بطلب الموما اليه ... مع التقدير

المرفقات:
كتاب الدائرة الثقافية في ماليزيا

د. صادق عامر ابونايلة
مدير قسم شؤون الدارسين في الخارج

٢٠١٤/٦/٤

نسخة منه إلى //
- مكتب السيد المدير العام/ للتفضل بالاطلاع... مع التقدير
- قسم شؤون الدارسين في الخارج / الوطن العربي / نفقة/ ماليزيا

محمد باقر ٦/٤//

موقع دائرة البعثات والعلاقات الثقافية: Website: www.Scrdiraq.com
الدائرة: Email: scrd@mohesr.gov.iq ايميل

بسم الله الرحمن الرحيم

١٧٦٩٢

العدد: ص ب /١٤/

التأريخ: / /٢٠١٤

٦ ٥

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
دائرة البعثات والعلاقات الثقافية
قسم شؤون الدارسين في الخارج/الوطن واسيا

وزارة التعليم العالي والبحث العلمي
Ministry of Higher Education & Scientific Research

الى/ الجامعات
جامعة بابل
جامعة الكوفة
جامعة كربلاء
جامعة المثنى
جامعة القادسية
م/ احالة

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بسم الله الرحمن الرحيم

١٧٦٩٢

جمهورية العراق
وزارة التعليم العالي والبحث العلمي
دائرة البعثات والعلاقات الثقافية
قسم شؤون الدارسين في الخارج/الوطن واسيا

العدد: ص ب /١٤/
التأريخ: / /٢٠١٤

وزارة التعليم العالي والبحث العلمي
Ministry of Higher Education & Scientific Research

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مدير قسم شؤون الدارسين في الخارج
٢٠١٤/٦/

نسخة منه إلى //
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APPENDIX H

SAMPLE SIZE

جدول رقم (7) لم يالوفني

الكلية/المعهد/المركز	لم يالوفني لموجود 2013/2012											
	فلنيين						اردنيين					اجملي
	بمل وم عالي	بكالويوس	بمل وم	اعدادية	بتوسطة فلقل	بمل وم عالي	بكالويوس	بمل وم	اعدادية	بتوسطة فلقل	بمل وم عالي	مجموع
المكتبة		16	1	2			3		1	1		26
كلية رة والتصاد		7	2	1			37	4	6	2		71
التربية العلوم انسانية	1	11	6	3	-	3	25	3	5	-	4	76
التربية الفنية		18	5	1			8	2	2			42
طب اسنان	4	2	1	1			11	2	1		4	22
التمريض		4		1			5		2			13
القانون		**15**	**2**	**2**			**18**	**4**	**3**	**2**		**74**
الزراعة	2	35	4	1	0	0	7	2	4	1	2	78
السياحة الفندقية		11	1				9	2	4			32
التطبيقية	4	46	2	0	0	0	7	3	0	6	4	71
رئاسة الجامعة	2	137	31	9		1	130	29	29	171	3	573
كلية العلوم الطبية التطبيقية	—	7	3	1	—	—	11	—	1	6	—	29
الطب	3	51	7	1			16	2	4	3	3	94
الطب البيطري	7	11	2	2	2		7	1	1	2	7	37
كلية العلوم ا يه		7	3				10	17	4	2	4	37
العلوم	3	69	2	3			77	17	3	7	8	124
الهندسة	2	42	10	3	0	0	57	16	7	6	1	98

الكلية	دكتوراه	ماجستير	بورد	بورد عراقي	دبلوم عالي	بكلوريوس	دبلوم	اعدادية	متوسطة
رئاسة الجامعة	11	48	0	0	11	417	190	133	37
الطب	50	51	17	89	11	70	32	23	2
الهندسة	80	153	0	0	5	109	94	25	5
طب الاسنان	12	48	1	0	0	48	23	21	5
العلوم	85	99	0	0	3	91	38	18	1
العلوم للبنات	45	78	0	0	1	65	14	14	2
القانون	27	27	0	0	1	28	23	8	2
الاداب	27	28	0	0	1	30	17	10	1
الادارة والاقتصاد	18	27	0	0	0	39	18	7	2
التربية للعلوم الانسانية	80	71	0	0	0	40	12	6	1
التربية الاساسية	39	72	0	0	2	48	18	19	7
الفنون الجميلة	115	71	0	0	3	54	24	18	3
التربية الرياضية	51	13	0	0	0	21	22	6	6
التمريض	17	8	0	0	0	30	15	8	1
هندسة المواد	25	44	0	0	4	58	23	9	1
الدراسات القرآنية	28	15	0	0	0	16	9	6	0
الصيدلة	14	35	0	1	2	26	6	8	2
التربية للعلوم الصرفة	19	49	0	0	0	34	11	6	1
تكنلوجيا المعلومات	14	40	0	0	0	32	14	4	2

قائمة التقارير Export2Excel

جدول رقم (١) اعداد التدريسيين في جامعة الكوفة موزعين بحسب الجامعة والكلية والقسم واللقب العلمي والشهادة والجنس للعام الدراسي ٢٠١٢/٢٠١٣
دراسة صباحية

الكلية	القسم	اللقب العلمي	دكتوراه			ماجستير			دبلوم عالي			بكالوريوس			المجموع		
			ذكور	اناث	مجموع	ذكور	اناث	مجموع	ذكور	اناث	مجموع	ذكور	اناث	مجموع	ذكور	اناث	مجموع
ديوان الجامعة		استاذ متمرس															
		استاذ	2		2										2		2
		استاذ مساعد	1	1	2										1	1	2
		مدرس	6		6	3	1	4							9	1	10
		مدرس مساعد				18	5	23							18	5	23
		المجموع	9	1	10	21	6	27							30	7	37
		استاذ متمرس															
		استاذ															
		استاذ مساعد															
		مدرس															
		مدرس مساعد															
		المجموع															
		استاذ متمرس															
		استاذ															
		استاذ مساعد															
		مدرس															
		مدرس مساعد															
		المجموع															
		استاذ متمرس															
		استاذ															
		استاذ مساعد															
		مدرس															
		مدرس مساعد															
		استاذ متمرس															
	مجموع الكلية	استاذ	2		2										2		2
		استاذ مساعد	1	1	2										1	1	2
		مدرس	6		6	3	1	4							9	1	10
		مدرس مساعد				18	5	23							18	5	23
		المجموع	9	1	10	21	6	37							30	7	37
		المجموع															

جدول رقم (١) اعداد الموظفين جامعة الكوفة على الملاك الدائم للعام الدراسي ٢٠١٢/٢٠١٣

التحصيل الدراسي	الاداريين			الفنيين			الخدمات			المجموع		
	ذكور	اناث	مجموع	ذكور	اناث	مجموع	ذكور	اناث	مجموع	ذكور	اناث	مجموع
امي			0			0	23	8	31	23	8	31
يقرأ ويكتب			0			0	38	4	42	38	4	42
ابتدائية	2	1	3			0	83	8	91	85	9	94
متوسطة	5		5			0	35	7	42	40	7	47
اعدادية	3	20	23	15	1	16	10	2	12	28	23	51
دبلوم تقني	19	13	32	57	15	72	2		2	78	28	106
بكالوريوس	60	30	90	210	97	307			0	270	127	397
دبلوم عالي			0	4		4			0	4	0	4
ماجستير			0	4		4			0	4	0	4
المجموع	89	64	153	290	113	403	191	29	220	570	206	776

جدول رقم (١) اعداد الموظفين على الملاك الدائم للعام الدراسي ٢٠١٣/٢٠١٤ رئاسة جامعة القادسية

التحصيل الدراسي	الاداريين			الفنيين			الخدمات			المجموع		
	ذكور	اناث	مجموع	ذكور	اناث	مجموع	ذكور	اناث	مجموع	ذكور	اناث	مجموع
امي	1	2	3				6	3	9	7	5	12
يقرأ ويكتب	14		14	1	1	2	8	13	21	23	14	37
ابتدائية	16	9	25	7		7	16		16	39	9	48
متوسطة	9	6	15	1		1	4		4	14	6	20
اعدادية	12	34	46	11	2	13				23	36	59
دبلوم تقني	13	33	46	11	12	23	1		1	25	45	70
بكالوريوس	78	107	185	54	32	86				132	139	271
دبلوم عالي	1		1	2		2				3		3
المجموع	144	191	335	87	47	134	35	16	51	266	254	520

جدول رقم (١) اعداد التدريسيين موزعين بحسب الجامعة والكلية والقسم واللقب العلمي والشهادة والجنس للعام الدراسي ٢٠١٣/٢٠١٤
دراسة صباحية جامعة القادسية

الكلية	القسم	اللقب العلمي	دكتوراه			ماجستير			دبلوم عالي			بكالوريوس			المجموع		
			ذكور	اناث	مجموع	ذكور	اناث	مجموع	ذكور	اناث	مجموع	ذكور	اناث	مجموع	ذكور	اناث	مجموع
		استاذ متمرس															
		استاذ	1		1										1		1
		استاذ مساعد	1	2	3	1		1							2	2	4
		مدرس	3		3	1	1	2							4	1	5
	رئاسة الجامعة	مدرس مساعد				1	2	3							1	2	3
		المجموع	5	2	7	3	3	6							8	5	13

جدول رقم (٣) الموظفين على الملاك الدائم موزعين بحسب العنوان الوظيفي للعام الدراسي ٢٠١٢/٢٠١١

العنوان الوظيفي	متوسطة ودون متوسطة		اعدادية		دبلوم تقني		بكالوريوس		دبلوم عالي		ماجستير		المجموع		
	ذكور	اناث	ذكور	اناث	ذكور	اناث	ذكور	اناث	ذكور	اناث	ذكور	اناث	ذكور	اناث	المجموع
طبيب													0	0	0
طبيب اسنان													0	0	0
صيدلي													0	0	0
ممرض (معاون طبي)													0	0	0
مهندس (م.مهندس،رئيس مهندسين،مهندس اقدم)							19	19	1				20	19	39
مهندس حاسبات							2	1					1	2	3
مبرمج(م.مبرمج)/محلل انظمة							4	6					12	4	10
مهندس زراعي							2	12					0	0	0
طبيب بيطري							0	0					3	0	3
فيزياتي (م.فيزياتي)							0	3					0	1	1
كيمياتي (م.كيمياوي)							1	0					1	0	1
جيولوجي							0	1					1	3	4
محلل مختبر (بايولوجي)							3	1					0	0	0
مساعد مختبر							0	0					25	5	30
ملاحظ(م. ملاحظ ،رئيس ملاحظين،م.مدير)			5	0	5	1	15	4					23	3	26
ملاحظ فني(م. ملاحظ فني،رئيس ملاحظين فنيين،م.مدير فني)			1	0	22	2	0	1					0	1	1
مدير فني							0	1					3	0	3
مدرب فني (مدرب العاب)							3	0					0	0	0
مدير(مدير حسابات، مدير تدقيق)							0	0					0	0	0
خبير							0	0					15	7	22
محاسب(م.محاسب،امين صندوق، كاتب حسابات)			1	0	4	5	11	1					0	3	3
مدقق (م.مدقق)							3	0					0	0	0
احصائي (م.احصائي،رئيس احصائيين)							0	0					4	3	7
باحث (م.باحث،رئيس باحثين)							4	3					6	2	8
قانوني (م.قانوني، مشاور قانوني)							6	2					0	0	0
مترجم (م.مترجم،رئيس مترجمين)							0	0					0	0	0
مشغل حاسبة							0	0					2	1	3
امين مخزن							2	1					2	1	3
امين مكتبة							0	0					25	20	45
كاتب طابعة(مسجل بيانات،كاتب)	9	7	8	3	6	9	2	1					131	3	134
حارس (حرس امني)	125	3	6	0	0	0	0	0					25	0	25
سائق (رئيس سواق، السواق كافة)	25	0	0	0	0	0	0	0					50	8	58
حرفي (رئيس حرفيين)	37	7	12	1	1	0	0	0					9	11	20
موظف خدمات	9	11	0	0	0	0	0	0					16	3	19
فني	2	2	1	0	13	1	0	0					0	9	9
اخرى	0	0	0	0	0	0	0	9					383	108	491
المجموع	207	30	33	5	53	19	89	54	1						

ملاحظة: المشمولين في الجدول فقط الموظفين دون التدريسيين

ملاحظة: يجب ان يتطابق المجموع في جدول رقم (٣) مع المجموع في جدول رقم (١و٤)

ملاحظة: يتم الالتزام بالعناوين الوظيفية اعلاه

No.	University	Uni Staff	Chancellery	Admin.& Academic	Expected staff	Distribute	Collected
1	Kufa	4242	817	554	3-4-5	150	69
2	Babylon	4604	847	677	3-4-5	150	65
3	Al-Qadysiah	2521	533	357	3-4-5	120	53
4	Karblaa	2377	573	345	3-4-5	120	49
5	Al-Muthana	1238	491	200	3-4-5	120	38
	Total	14952	3261	2133		660	274

APPENDIX I

QUESTIONNAIRE

تبادل المعلومات الإلكترونية بين الجامعات الحكومية العراقية ووزارة التعليم العالي والبحث العلمي
دراسة مسحية لآراء عينة من العاملين في الجامعات

هذه الدراسة تركز على واقع تبادل المعلومات الإلكتروني بين الجامعات الحكومية ووزارة التعليم العالي والبحث العلمي في العراق. تبادل المعلومات الإلكتروني يعني تبادل المعلومات التي تحتاجها الجامعات من وزارة التعليم العالي والبحث العلمي والتي تستطيع الجامعات توفيرها من مؤسساتها الخاصة. هذا التبادل يساهم في تحسين جودة المعلومات المتاحة لمتخذي القرار في الجامعات وتطوير خدمات الجامعة وتسهيل الإجراءات الإدارية. كما يساعد على اتخاذ القرار الأفضل الذي يعود بالفائدة على الجامعات. من هذا المنطلق تهدف هذه الدراسة إلى التعرف على واقع تبادل المعلومات الإلكتروني في قطاع التعليم العالي في العراق من خلال دراسة العوامل المؤثرة في تبادل المعلومات الإلكتروني بين الجامعات ووزارة التعليم العالي والبحث العلمي. وأيضا، هذه الدراسة تستخدم مفهوم مخزن البيانات الموحد الذي يستوعب البيانات (كالإحصائيات) التي تحتاجها الجامعات من وزارة التعليم العالي والبحث العلمي. وهذا المخزن سيتم تصميمه بحيث يستوعب البيانات التي تحتاجها الجامعات من وزارة التعليم العالي والبحث العلمي وذلك بعد أن يتم تحديثها من قبل الموظفين المسؤولين عن البيانات في كل من الوزارة والجامعات.

تعليمات للموظفين الإداريين:

الغرض من هذه الاستبيان هو دراسة متطلبات المستخدمين حول تبني استخدام تقنية المعلومات وتحديدا تبادل المعلومات إلكترونيا. هذا الاستبيان مصمم للحصول على معلومات تساعد على فهم كيفية تبادل المعلومات إلكترونيا بين الجامعات ووزارة التعليم العالي والبحث العلمي. ولذلك، نأمل أن تكون إجاباتك صادقة وموضوعية قدر الإمكان. ولهذا نرجو منكم أن لا تتركوا أي سؤال دون إجابة. وفي النهاية نأمل أن تكون إجاباتكم مفيدة لنا في تحقيق أهداف هذه الدراسة. وشكرا لكم على تعاونكم.

هذا الاستبيان هو جزء من دراسة للحصول على درجة الدكتوراه في إدارة الأعمال. وتهدف هذه الدراسة إلى التعرف على واقع تبادل المعلومات الإلكتروني بين الجامعات الحكومية ووزارة التعليم العالي والبحث العلمي في العراق. يرجى قراءة كل سؤال بعناية والإجابة عليه بكل دقة وموضوعية. نحن نقدر وقتك الثمين الذي خصصته لملء هذا الاستبيان.

شكرا لك على وقتك وتعاونك. ولأن نجاح هذه الدراسة يعتمد بشكل كبير على إجاباتك الصحيحة والدقيقة، نأمل أن تكون إجاباتك صحيحة.

مع خالص التقدير والاحترام،

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: قلق من اعطاء صوره جيدة واختيارات عالية, ا جلف ي هذا ا ستبيان تكون على ا ساس التالي

1 = افق بشدة
2 = افق
1 = محايد
4 = فق
1 = فق بشدة

: م حظة مهمة: يجب التي ابة عل جميع ا سئلة ا ختيار ا جابة التي تعبر عن رأيك بحيث ان تتأكد بعض الق اط التالية

1. ان هذا ا ستبيان تكون من ست اجزاء (ول- لسادس(ولكل جزء يتضمن عدد من ا سئلة.
2. ارجوك اجب عن كل ا سئلة في كل جزء بوضع ط مة صح)/(على ا ختيار الذي تجده مناسبا جلتك.
1. بعض ا جابات بسيطة ولكن تتطلب قراءة متأنية لكل سؤال ومن ارجو منك ان تقرأ ا سئلة بدقة.
4. تأكد بأنك قد اجبت على جميع ا سئلة ودون ترك اي سؤال بدون اجابة.
1. تقوم بوضع اشارة ( ) في المكان ا ختيار ا جابة المناسبة في السؤال الواحد.

لجزء ا ول: لخصائص لديموغرافية

1. **ما هو جنسك؟**

ذكر [] نثى []

2. **اختار عمرك,**

اقل من 30 [] بين 30-40 [] بين 41-50 [] كثر من 50 سنة []

3. **اختار درجة تعليمك العلي,**

بلوم [] ماجستير [] دكتورة [] اخرى ----------

4. **عدد سنين الخبرة التي تمتلكها في التعليم العلي,**

من 1 الى 5 [] من 6 الى 10 [] من 11 الى 15 [] كثر من 15 []

5. **نوع المركز الوظيفي,**

اداري [] اداري و كاديمي []

6. **ما هو موقعك؟**

محاضر (ستاذ مساعد, مساعد ستاذ, ا ستاذ المشارك( ) [ ] محاضر) محاضر كبير, محاضر متعاقد, معاون محاضر( ) [ ] مسؤول شعبة [ ] موظف] [

7. **ما هو اسم المركز المكتب, المركز او القسم الذي تنتمي اليه ؟ اذا كان ا سم غير موجود يرجى كتابته في الخانات في اخر صفحة في لجدول ادناه.**

اسم المكتب, المركز او المركز	(√) اختار واحد فقط بوضع ع ة
ستاذ المساعد	
البحوث والتطوير	
شؤون الطلبة	
الدراسات والتخطيط والمتابعة	
التعليم المستمر	
التصديقات والوثائق	
البعثات والع قات الثقافية	
الشؤون المالية	
الع قات العامة والع م	
التربية البدنية	
الشؤون الفندقية	
الشؤون القانونية	
التدقيق	
الجودة	
ا من والسلامة	
مديرية القياس والدخول	
الدراسات	
تطوير التدريس والتدريب الجامعي	
سكن	
البحث والتأهيل الجامعي	

لجزء لثاني: حل قتبادل لمعلومات لكترونية

1. هل قمتب علم يبقبادل معلومات لكترونيا عن طريق استخدام ا هزة ا لكترونية)خط ارضي, وجها يل يام يل, موقع ا لكتروني لكمبيرة يب ول خ(مع موظفي وزارة يبقاعل يم لاعل ي؟

نعم [] ك []

2. ما فترة تقويم بيقي قلبادل معلومات لكترونيا مع وزارة لتعليم لاعالي يطريقة استخدام ا هزة ا لكترونية؟ أل كتقتيت خدم ها زاخر ي ريجتي تم يف ي لصف ا رغ.

ا هزة ا لكترونية	و هرة	هرة واحد قل سنة	هرة في لشهر	عدد من لمرات في لشهر	عدد من لمرات في ا وع	عدد من لمرات في لي وم
لمبيل لخط ا رضي						
لبريد ا لكتروني)ا يميل(						
مواقع ا لكتروني						
كامير ا لفيب)محا شة في يو(						
دخول لى قاعدة يانات لوزارة						

3. تقريبا ما مي لنسبة قل معلومات لكترونية أ لتي يتم ج اعتك و لوزارة لتعليم لاعلي؟

[ ] [100-81%] [80-61%] [60-41%] [40-21%] [20-1%] [0%

4. منذ متى بدأ قلبادل لكتروني لمعلومات بين ج اعتك و وزارة لتعليم لاعلي؟

[ ] [أقل من سنة] [3-1سنين] [6-4سنين] [9-7سنين] [أكثر من 10سنين] [

5. صف أنواع لمعلومات لتي يتم تبادل ها من لى وزارة لتعليم لاعلي. بالنقر لى ست خدم من وع آخر من لمعلومات لتي ريجتي م تعفها في لصف ا رغ.

نوع لمعلومات	لنسبة لتي قلبادل تلك لمعلومات لكترونيا أ من ولى وزارة لتعليم لاعلي					
	0%	20-1%	40-21%	60-41%	80-61%	100-81%
معلومات قلطلب						
معلومات قلموظفين						
معلومات تلتدريبيين						
طلبات اوقترا حات						
ا يفادات						
لبحوث ول دراسات						
قوانين ونشريعات						
توجيهات						

6. ان عملية بقبادل لمعلومات لكترونيا بين ج اعتك ووزارة لتعليم لاعلي تساعد في تجنب ادل لبيانات, لمعلومات, لطلبات, لقوانين لتوجيهات, ولمشاريع؟

نعم [] ك []

7. ان عملية بقبادل لمعلومات لكترونيا بين ج اعتك ووزارة لتعليم لاعلي تجنب وقت لى ستغرق في لبيانات, لمعلومات, لطلبات, لقوانين لتوجيهات, ولمشاريع لتي تحتاج لى ستغرق في لبحث عن لمعلومات لمطلوبة؟

نعم [] ك []

8. ان فتقار كمية لبيانات, لمعلومات, لطلبات, لقوانين لتوجيهات, ولمشاريع لتي تحتاج لى ستغرق في لبحث عن لمعلومات لمطلوبة تساعد صناع لقرار في ج اعتك في ا خاذ قرارات فضل؟

نعم [] ك []

9. ان دعم صناع لقرار في ج اعتك سوف يساعد م في نجاح مبدأ لمركزية لجمع ية؟

نعم [] ك []

11. في ا حتياطي روزارة تتعامل مع قنوات جديدة لى ست هل ترغب في ا ستفادة من لمعلومات لكترونية بين وزارتك, ومؤسسات خدم ها؟

نعم [] ك []

لجزء لثالث: خص بئص بتبادل لمع ومات لالكترونية

	اوفلق وبشدة	اوفلق	م حايد	انفق	انفق وبشدة
ف1: بتبادل الكتروني لمع ومات ستقل بتكلفة من بتبادل لورقي للمع ومات					
ف2: بتبادل الكتروني لمع ومة يوفر للمع ومة بوقت قل قارنة بالطرق لورقية					
ف3: بتبادل الكتروني لمع ومة يحسن من لخدمات لجتماعية					
ف4: بتبادل الكتروني لمع ومات يتيح عملية لرد او ا جبة لسرع ولسهل					
ف5: بتبادل الكتروني لمع ومة يساعد في يص ع لقرار					
ف6: بتبادل الكتروني لمع ومة يحسن من مستوى لتواصل وا ص ال مع وزارة لتخطيط لاعلي					
ف7: بتبادل الكتروني لمع ومات يزيد مستوى لثقة بين موظفي لجتماعات وموظفي لوزارة					
ف8: بتبادل الكتروني لمع ومة يقلل من بيروقراطية (تباع ا وامر بخطاء ر ه بدون اي لون ه (او مرون ه					
ف9: بتبادل الكتروني لمع ومات يزيد من ا ال لورقية					
م1: من لك مخاطر من ق ص حة يمكن لتجنبها بتبادل لكتروني أ					
م2: من لثقة بين لمتعاملين بتبادل لكتروني					
م3: بتبادل الكتروني لمع ومة يقلل من عملية لسيطرة لمتبادلة لكل ما قل ا					
م4: بتبادل الكتروني لمع ومات يمكن تقليص عدد من ق وقف ن اع في عملية لقرارات					
م5: يس هناك مخاطر من خسارة لمع ومات نتيجة لاختراق لكتروني					
ك1: لا ش اعن نظم لمع ومات لجتماعية تكون مكلفة					
ك2: تدريب موظفين لجتماعات على تقنيات لحاسوب يكلف					
ك3: صيانة لبرامج وا دة لحاسوب يكلف					
ك4: بتعريب بين لمتعاملين من شبكات وا ص ات يكون رخيص					

لجزء لرابع: لخص بئص ا دارية

	اوفلق وبشدة	اوفلق	م حايد	انفق	انفق وبشدة
ب1: جتماعات لمتعاملين لى تبطيق ات نظم مع ومات ودعم قنيات جديدة					
ب2: جتماعات لمتعاملين تحتاج لى مشاركة يومية جيدة					
ب3: موظفين ا دريين تحتاجون لى مع فة جيدة بلحاسوب					
ب4: تبادل لمع ومات بصورة لكترونية تاج لى ا دة لكترونية لبرامج لحاسوبية ب راغي مج ال لحاسوب					
ج1: مع ومة ان ا لخاصة لمتبادلة مع وزارة لتخطيط لاعلي					
ج2: جودة لمع ومات تزيد من لثقة بين موظفين وموظفين وزارة لتخطيط لاعلي					
ج3: جودة لمع ومة تحسن لاعلاقة بين موظفين لوزارة					
ج4: لمع ومات لجيدة تقلل من جودة صنع لقرار					
تم مستوى لخبرة في لمجال لتكنولوجي و لكتروني عند موظفين تختلف عن مستوى خبرات موظفي وزارة لتخطيط لاعلي.					
تم لبنية لتحتية قنية ص ا ت ولشبكات قواعد لبيانات ختلفة بين جتماعات ووزارة لتخطيط لاعلي.					
تتوافق بادل لمع ومات لكتروني مع وزارة لتخطيط لاعلي يتعارض مع لسياسات جتماعات.					
ص1: تكلفة لتي يتم بها لمع ومات لمتبادلة لمع ومات لكترونية يس مكلفة مقارنة مع ا وسائل لتي تستخدم ا.					
ص2: بتبادل لمع ومات لكتروني أ مية كبيرة.					
د1: تحتاج لى تبادل لمع ومات عن طريق شبكة قواعد لبيانات بين جتماعات و وزارة لتخطيط لاعلي.					
د2: بان تواجه مع ومات جتماعات ووزارة لتخطيط لاعلي في بعض لحالات صعوبة في دعم عملية بتبادل ا.					
د3: تحتاج لى خزن مع ومات جتماعات و وزارة لتخطيط لاعلي مما يتوجب وجود مع ومات لكي يس مل من عملية لفحص ولتي ا.					
د4: سهولة لفحص ول لى قواعد لبيانات عرض من عملية تبادل لمع ومات.					

لجزء لخامس: خص لنص لمظمة

	اوفق وبشدة	اوفق	محايد	انفق	انفق وبشدة
أ1: ا ارلقع لي ستتيطي حف يز موظفي لجامعة عن طريق لحوفلز أو لامتفدأت ولاتي بات.					
أ2: ادلتون اعلي ا مت مقب عمي قنلب ادل لامع لوم ات لكتروني أ مع وزارل تعليم لاعلي.					
أ3: أدلتون اعلي يتتجب ر ان عمي يقنلب ادل لامع لوم بصوره لكترونية مع لوزارة امر م مم لجامعتن ا.					
أ4: ا ارلقع لي في جامعتن لاي س ل ه ا دور في دعم قنلب ادل لامع لوم ات لكتروني أ مع لوزارة.					
ش1: جامعتن او وزلاة لتعل يم لاعلي لدي ه موظفو مت عاونين جيد.					
ش2: مس تو ى فهم موم لي عاونين موظفي جامعتن لجيد.					
ش3: لي عاو لاجيدين جامعتن ا ووزارة لتعليم لاعلي يقللمن تنلب ادل لمع لوم ات لكتروني ا.					
ح1: لبنية تحتية نظم لمع لوم ات تزيد من تنلب ادل لامع لوم ات لكتروني أ مع وزارل تعليم لاعلي.					
ح2: عدد لموظفي لذين يزيد من تنلب ادل لامع لوم ات لكتروني أ مع وزلاة لتعليم لاعلي.					
ح3: لتكل ف ان حجم لجامعي لكبر لتقلل من رغبتهم في تنلب ادل لامع لوم ات مع وزارل تعليم لاعلي.					

لجزء لسادس: لخص لنهائي

	اوفق وبشدة	اوفق	محايد	انفق	انفق وبشدة
ق1: جامعتن لتي تشجع اعضاء هيئة لتدريس في لتنظيم تنلب ادل لامع لوم ات لكتروني ا مع وزلاة لتعليم لاعلي.					
ق2: تشجع ات ولقوانين لحكومية جميع قوة لعمل في جامعتن ا ووزلاة لتعليم لاعلي.					
ق3: تشجع ات ولقوانين تزيد من مخاوف وخطورة تنلب ادل لكتروني للمع لوم ات.					
ث1: جامعتن ا ووزارة لتعليم لاعلي لدي ه مس تو ى عال من لثقة لتنلب ادل.					
ث2: جامعتن لي جب ان تحمي وتدعم موظفي ها عن دمي نلب ادل لامع لوم ات مم لكتروني ا كما يزيد من ثقة هم بنظم تنلب ادل لكتروني.					
ث3: لموظفي عمي قنلب ادل لامع لوم ات لكتروني يتأثر بزيد من لمشاركة ولتعاون.					
ث4: لثقة بين موظفي جامعتن او وزارل تعليم لاعلي يمكن أن تشجع طين طباع اسلبي.					
خ1: وزارل تعليم لاعلي أوصت على ان جامعتن لي جعل تنلب ادل لامع لوم ات لكتروني ا مع ها.					
خ2: وزارل تعليم لاعلي طلبت من جامعتن ا تنلب ادل لامع لوم ات لكتروني ا مع ها.					
خ3: وزارل تعليم لاعلي فرت مع لوم ات عن فاوض د وض ار على قنلب ادل لامع لوم بصورة لكتروني ة.					
خ4: وزارة لتعليم لاعلي سل ه لتأثير على قرارتهن في لمشاركة او عدم لمشاركة في تنلب ادل لمع لوم ات لكتروني أ مع هم.					
ع1: عدد لجامعات لمشاركة في عملية تنلب ادل لمع لوم بصورة لكتروني ة مع لوزارة يزيد من عملية تبادلها مع لوزارة.					
ع2: مع ظم مع لومات لتنلب ادل مع ووزارل تعليم لاعلي يتم بصورة لكتروني ة أو من خلال تنلب ادل ها قريبا بطريقة لكتروني ة.					
ع3: تعامل ان ظمة تنلب ادل لامع لوم بصورة لكتروني ة مقبل لجامعات امر ضروري و فهر منه.					
ع4: تنلب ادل لكتروني بين لجامعات ا ى ولوزارة لتشجع لمشاركة في عملية تنلب ادل لمع لوم ات لكتروني أ مع لوزارة.					
ع ج1: جامعتن او وزلاة لتعليم لاعلي لدي موظفي ها لي طلبون قدما ولو ء.					
ع ج2: لاع قات ا تجمع حسن بين جامعتن او وزارل تعليم لاعلي.					
ع ج3: جامعتن او وزارل تعليم لاعلي لدي ها عاقات جتماعي قوية.					

أشكرك على تعاونك في لت ها عن هذا ا بي ان تنلب ادل لامع لوم ات لكتروني بين جامعتك وزارة لتعليم لاعلي وأن هذه لدرس قد تقيل في ذكر ه فستتر في ذكره او يأمن لثبات ها أن اه.

من لل لتفوق

This study focuses on increase electronic information sharing between public universities Ministry of Higher Education and Scientific Research in Iraq. Electronic information sharing now plays an important role in modern institutions by providing more information which can be a useful resource for the decision makers. The increment of information can help the employee, staff and decision makers to make better decision which can support universities decentralization principle. With these concerns, this study intends to bases on electronic information sharing in Iraqi higher education sector by studying the factors influences that increase of electronic information sharing among universities and Ministry. Moreover, this study usesconcept of a common storage (data warehouse) as factor to increase the electronic information sharing indirectly because it can store huge amount of information of the Ministry and universities in one repository which make information available and accessible to Ministry and universities members.

Dear Administrative staff:

The purpose of this survey is to examine your perceptions about using ICT to share information electronically. This survey is designed to obtain information that will assist to understanding how an employee like you can share the information by using ICT. Hence, your honest opinion and success of this survey depends on your participation and candid responses. We would therefore greatly appreciate your assistance in answering the questionnaire. Please be assured that your responses will be kept strictly confidential. Individual participants will not be identified in the analysis as only aggregated results will be analyzed and presented.

The present survey is part of my study for PhD degree that tries to determine the factors that increases electronic information sharing between public universities and Ministry of Higher Education to support universities decentralization principle in Iraqi higher education sector. Please read each questions carefully and answer it to the best of your ability. There are no correct or incorrect responses; we are merely interested in your personal point of view. This survey is designed for all staff who shares information electronically with the Ministry of Higher Educationand Scientific Research.

Thank you for your time and consideration. It is only with your generous help this study can be successful.

Sincerely Yours,

Mohammed Abdulameer Mohammed Albubaqer.
PhD Candidate, University Utara Malaysia.
Mobile#1:- +964-7801-280088 (Iraq).
Mobile#2:- +60-14- 90 35 750 (Malaysia).
Email: mhmdaldbaq@yahoo.com

Do not worry about projecting a good image and the numbers alongside the statements used in this survey stand for the following responses:

6 = Strongly Disagree,
7 = Disagree,
8 = Neither Disagree nor Agree,
9 = Agree, and
10= Strongly Agree

In making your ratings, please remember the following points

1. This survey contains five parts (1-6), and each section contains number of statements.
2. Please answer each of the statement related to the questions by ticking [√] alongside the number that best describes your answer.
3. Some of the questions may appear to be similar, but they do address somewhat different issues please read each question carefully.
4. Be sure to answer all items – do not omit any.
5. Never tick more than one number on a single scale.

Part 1: Demographic Characteristics

8. What is your gender?

Male [ ] Female [ ]

9. Identify the category that best describes your age group.

Under 30 [ ] 30-40 [ ] 41-50 [ ] 51 or older [ ]

10. Identify your highest education qualification.

Bachelor [ ] Master [ ] PhD [ ] Other ----------

11. Identify the years of your experience in the higher education sector.

1-5 [ ] 5-10 [ ]11-15[ ] over 16 [ ]

12. What is your work type?

Administrative [ ] Academic and Administrative [ ]

13. What is your position?

Top Manager [ ] Manager [ ] Responsible [ ] Employee [ ]

14. What is name of your office, department or center? If it is not found in the list, please write it down in the last raw.

Department Name	**Select one only (√)**
Presidency of university	
Research and Development	
Division of Student Affairs	
Studies, planning and follow-up	
Continuing Education	
Ratifications and documents	
Missions and Cultural	
Public Relations and Media	
Physical Education	
Relations Affairs	
Engineering Affairs	
General Secretariat of the library	
Finance Affairs	
Audit	
Dormitories	
Quality	
Legal Affairs	

Part 2: States of Electronic Information Sharing Practices

11. Do you use any of these deceives to share the information electronically with other staff in Ministryof Higher Education?

Yes [ ] No [ ]

12. How frequently do you use these devices to share the information? If you use another visual device please name it in the empty raw.

Electronic device	Never	one time in a year	Once a month	few times a month	few times a week	Few times a day
Phone line/ Mobile						
Email						
Websites						
Webcam						
Shared Databases						

13. Approximately what is the percent of all information shared electronically between your university and Ministryof Higher Education?

0% [ ] 1-20% [ ] 21-40% [ ] 41-60% [ ] 61-80% [ ] 81-100% [ ]

14. Approximately how long has your university been sharing information electronically with Ministryof Higher Education?

0% [ ] < 1 Year [ ] 1--3 Years [ ] 4-6 Years [ ] 7-9 Years [ ] 10+ Years [ ]

15. Describe the types of information (e.g. student information, staff information, Policies and Rules, etc.) that your university shares with Ministry of Higher Education. If you use another type of information please name it in the empty raw.

Types of information	**Percentage of Sharing Electronically**					
	0%	1-20%	21-40%	41-60%	61-80%	81-100%
Student information						
Administrative staff information						
Academic staff information						
Guidelines and suggestions						
Dispatches						
Scholarships and studies						
Policies and rules						
Guidelines						

16. Electronic information sharing between your university and Ministry of Higher Education help to exchange the information, requests, rules and guidelines easily and fast.

Yes [ ] No [ ]

17. Electronic information sharing between your university and Ministry of Higher Education provide information, requests, rules and guidelines within the right time.

Yes [ ] No [ ]

18. The increment of the information, requests, rules and guidelines within the right time can support decision makers when they make the university's decisions.

Yes [ ] No [ ]

19. Support decision makers in your university will help to make the principle of university decentralization successes?

Yes [ ] No [ ]

20. If Ministry of Higher Education develops a new technology to increase the electronic information sharing between your university and them, will you use it?

Yes [ ] No [ ]

Part 3: Electronic Information Sharing Characteristics

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Ben1: Electronic information sharing less cost than paper sharing.					
Ben2: Electronic information sharing provides information quickly.					
Ben3: Electronic information sharing improves University services.					
Ben4: Electronic information sharing makes the answering and responding faster and easier.					
Ben5: Electronic information sharing improves decision making.					
Ben6: Electronic information sharing improves connection and interaction with MOHESR					
Ben7: Electronic information sharing improves the trust between staffs in the University and MOHESR.					
Ben8: Electronic information sharing reduces the bureaucracy.					
Ben9: Electronic information sharing increases paperwork.					
Risk1: There are risks of accuracy/validity of shared information electronically.					
Risk2: There are risks of external evaluation/ criticism of shared information electronically.					
Risk3: Electronic information sharing prevents from individual controls over University policy.					
Risk4: Electronic information sharing threats nUniversity policy of making power.					
Risk5: There are no challenges of losing information while sharing.					
Cost1: Information systems set-up are costly.					
Cost2: Staff training is costly					
Cost3: Software and hardware maintenance are costly.					
Cost4: Infrastructure set-up is cheap.					

Technological Characteristics :Part 4

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
ITcap1: Our University needs information systems applications and good technical support.					
ITcap 2: Our University needs good telecommunications infrastructure.					
ITcap3: Our adminstrators staffs need a good computer knoweldge.					
ITcap4: Electronic information sharing does not need hardware, software and IT skills.					
IQ1: Our current information has the quality to be shared with the Ministry of Higher Education.					
IQ2: The quality of information increases the trust between our staff and the Ministry of Higher Education's staff.					
IQ3: Information quality enhances the relationship among our staff and the Ministry's staff.					
IQ4: Information quality reduces the quality of decision making.					
Compat1: Employee experiences in our uinversity are different than in MOHESR.					
Compat2: Telecommunication infrastructure and database in our University are different than in MOHESR.					
Compat3: Electronic information sharing with the Ministry of Higher Education is contrary with our University's needs.					
Complix1: Information technologies required for electronic information sharing is easy to understand and use.					
Complix2: Electronic information sharing is a complex process.					
DW1: We need to share information by sharing our databases with MOHESR.					
DW2: Saving our information and the MOHESR's in one repository will support information sharing.					
DW3: We need to store our University information with MOHESR's in one data repository to make them accessible.					
DW4: Accessibility to access database opposite the information sharing.					

Organizational Characteristics :Part 5

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
TMS1: Top management motivates the University staff by incentives or rewards and punishments.					
TMS 2: Our top manager willing to share the University's information electronically with the Ministry of Higher Education.					
TMS3: Our top manger considers sharing information electronically with the Ministry as important to our University.					
TMS4: The University's top manager has no role to support the electronic information sharing with the Ministry.					
CC1: OurUniversity and the Ministry of Higher Education have a good collaboration.					
CC2: Our staff have a good collaboration concept.					
CC3: Good collaboration between University and the Ministry of Higher Education increases electronic information sharing.					
Size1: High number of information systems increases electronic information sharing with the Ministry of Higher Education.					
Size2: High number of employees improve electronic information sharing with the Ministry of Higher Education.					
Size3: Large Size of our University reduces electronic information sharing with the Ministry of Higher Education.					

Environmental Characteristics :Part 6

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Policy1: Our University needs the legislation and policies to organize electronic information sharing with MOHESR.					
Policy2: Legislation and policies build good relationships and trust among our staff and the Ministry's staff.					
Policy3: Legislation and Policies increase the risk of sharing electronic information between our University and the Ministry.					
Trust1: Our University and the Ministry of Higher Education have a high level of mutual trust.					
Trust2: Our University should protect the staff when they shared information electronically to increase their trust in sharing.					
Trust3: Trust in electronic information sharing increases the participation and collaboration.					
Trust4: The trust between University and the Ministry of Higher Education staffs give negative impression.					
Upper1: The Ministry of Higher Education recommends that our University shares information electronically.					
Upper2: The Ministry of Higher Education requests that our University shares information electronically.					
Upper3: The Ministry of Higher Education provides information regarding the advantages and disadvantages of sharing information.					
Upper4: The Ministry of Higher Education does not influence our decision to participate/not participate in electronic information sharing with them.					
Mass1: Number of universities that participant in electronic information sharing increase the sharing with the Ministry.					
Mass2: Most of our shared information with the Ministry of Higher Education is shared/will soon be shared electronically.					
Mass3: The use of electronic information sharing systems by Universities is inevitable and essential.					
Mass4: Electronic information sharing between other Universities and MOHESR fail to encourage us to participate in electronic information sharing with the Ministry.					
Network1: Our University and the Ministry have high concepts of commitment and loyalty.					
Network2: Social network improves collaborations between our University and the Ministry of Higher Education.					
Network3: Our University and the Ministry of Higher Education have a weak relationship.					

Thank you for your cooperation in completing this survey. If you feel that there are any points of particular interest to your University concerning electronic information sharing with MOHESR that this survey has failed to address, please feel free to elaborate it below.

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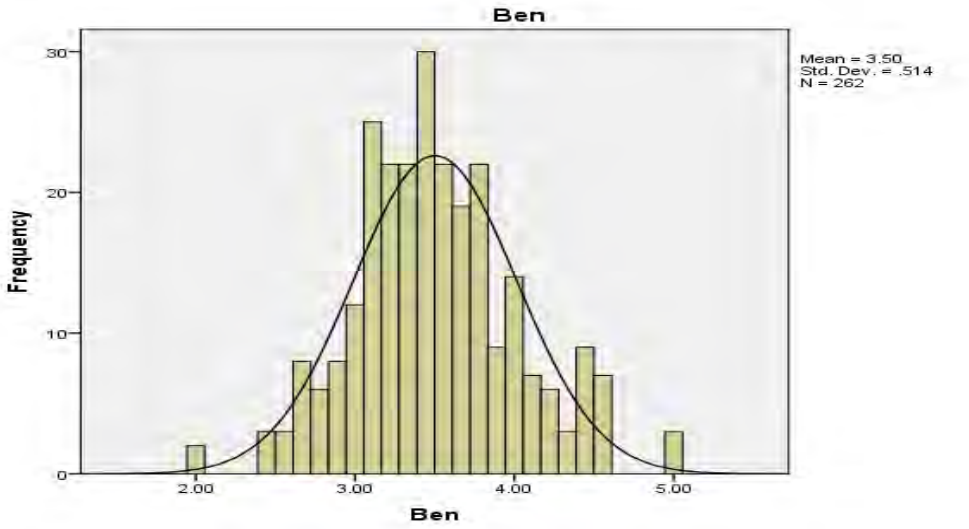
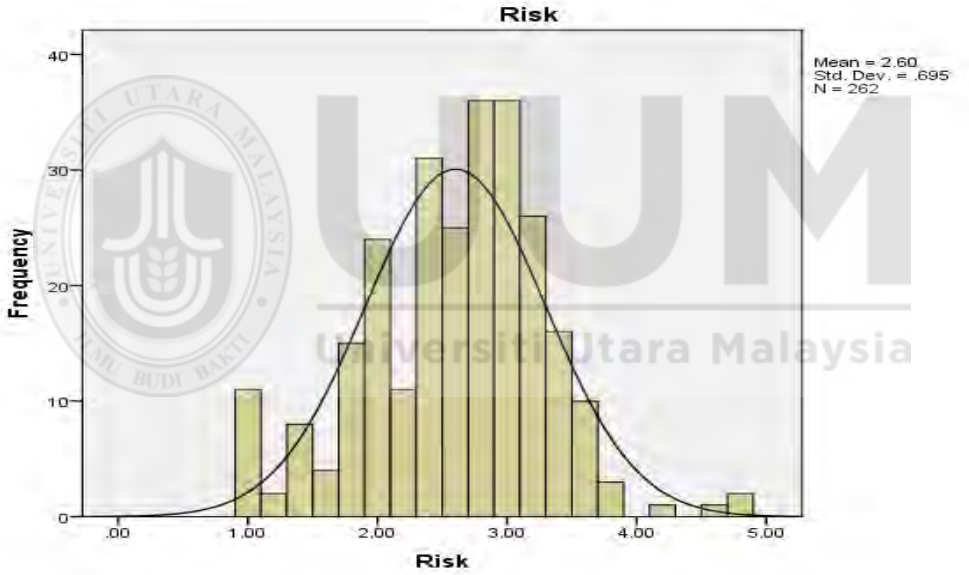
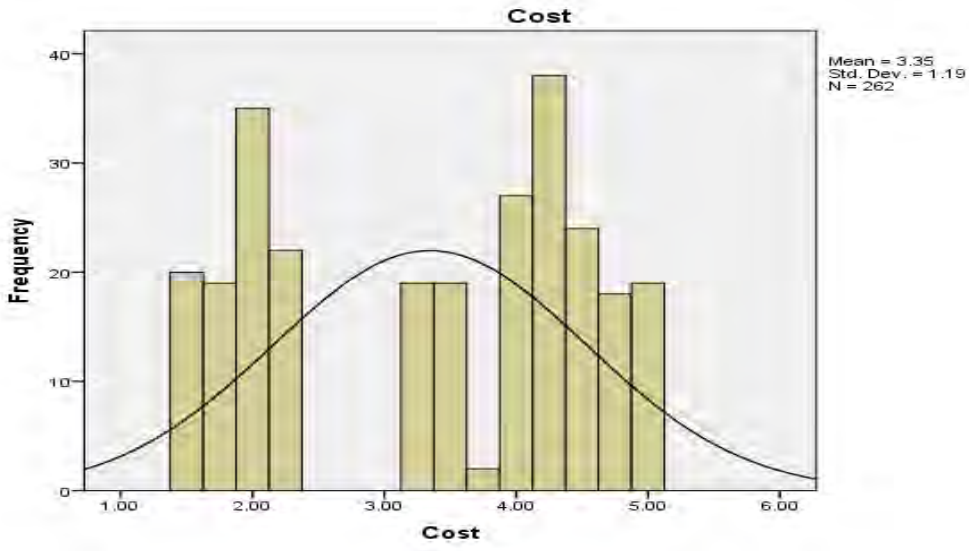
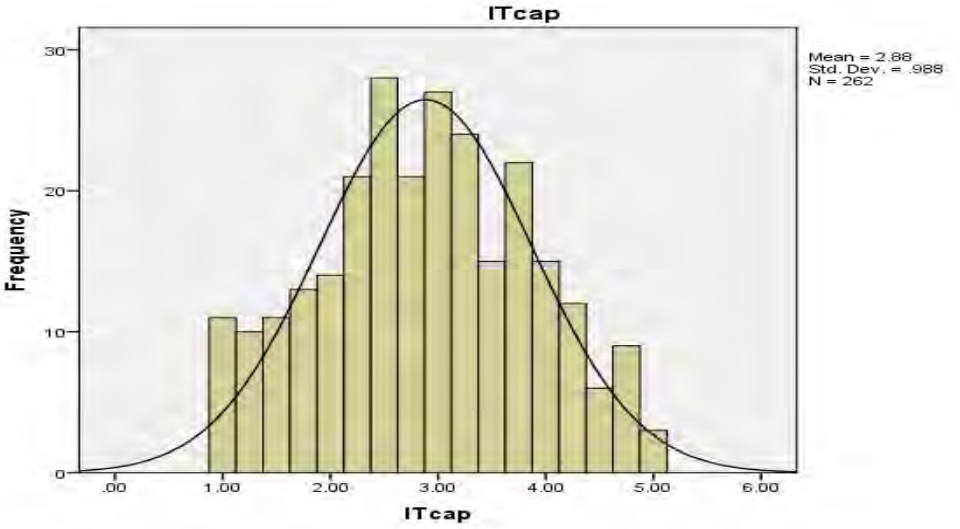
APPENDIX J

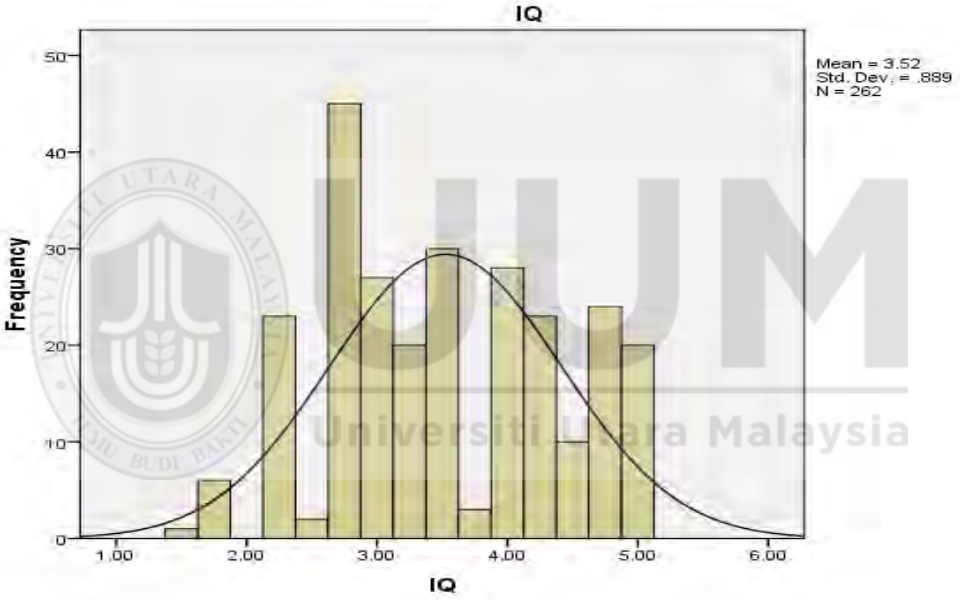
NORMALITY

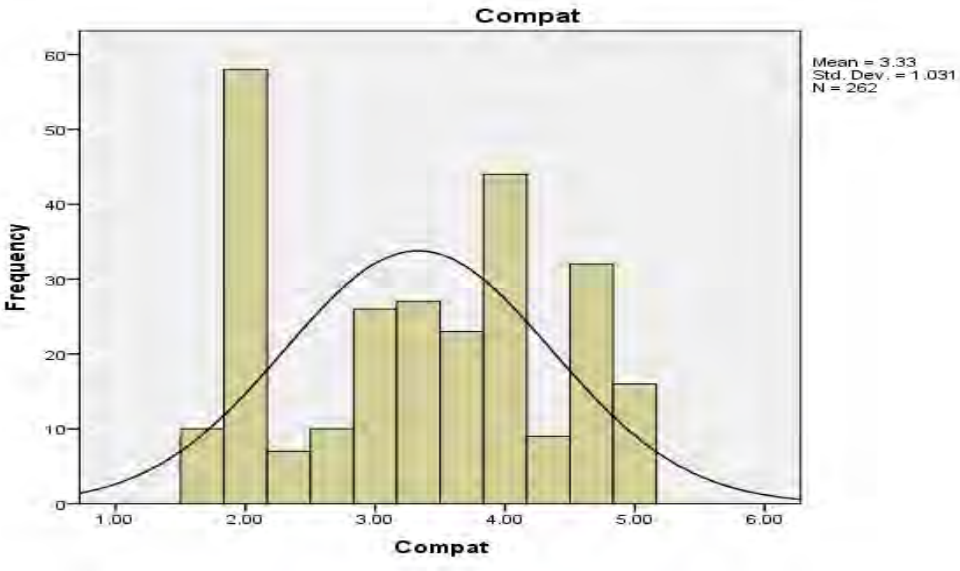


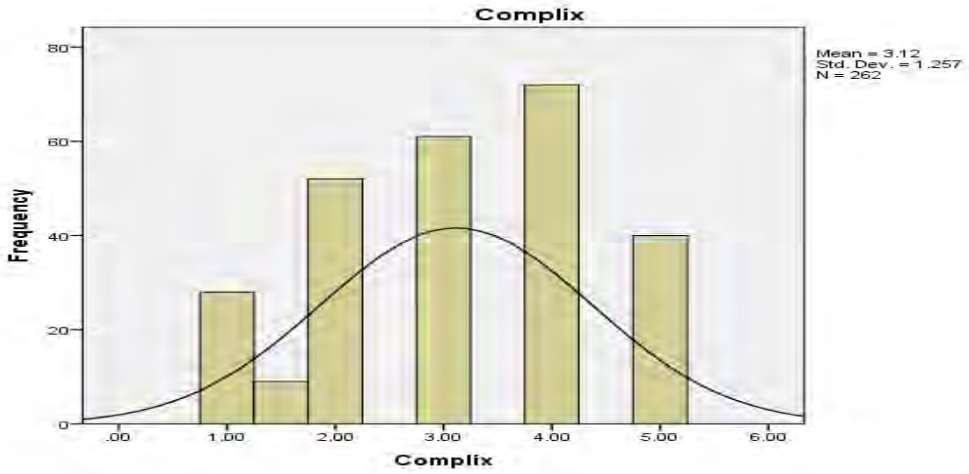


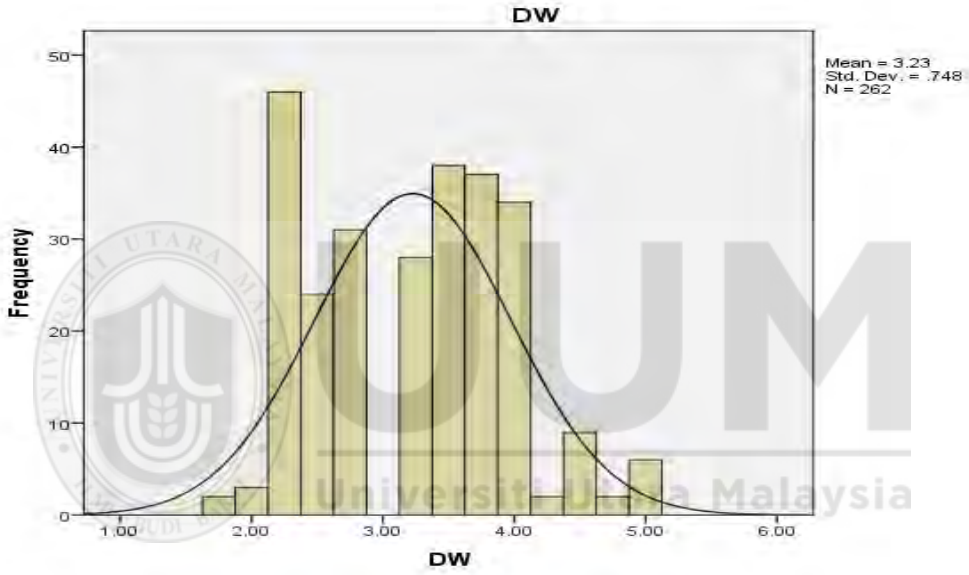


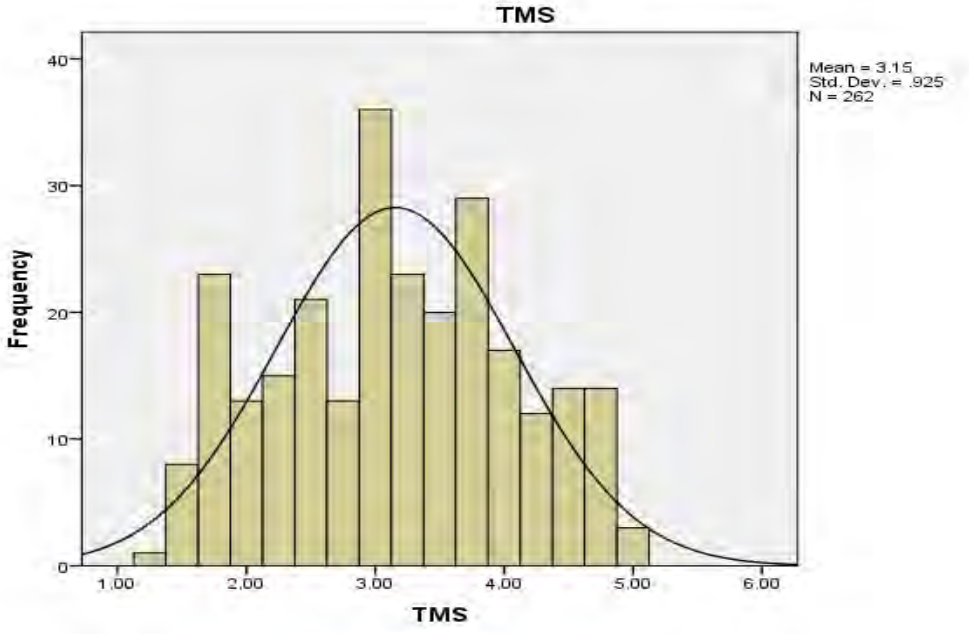


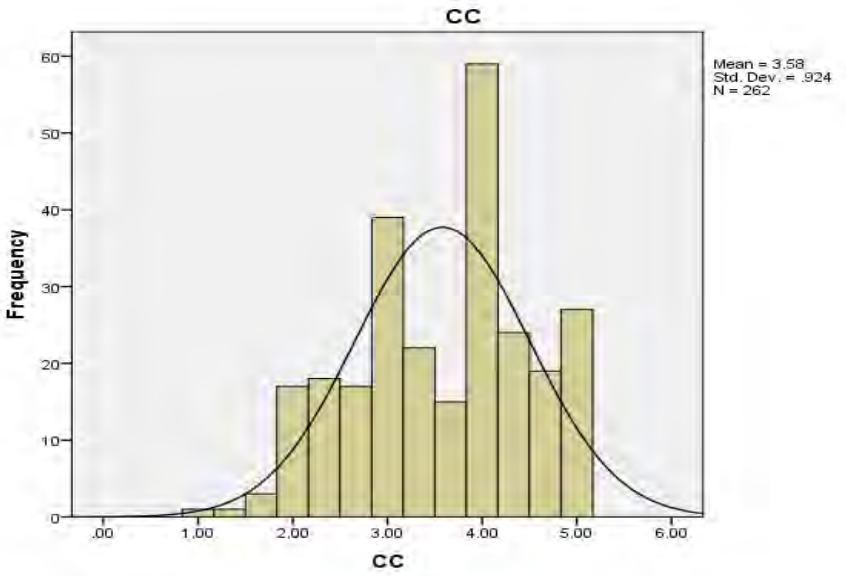


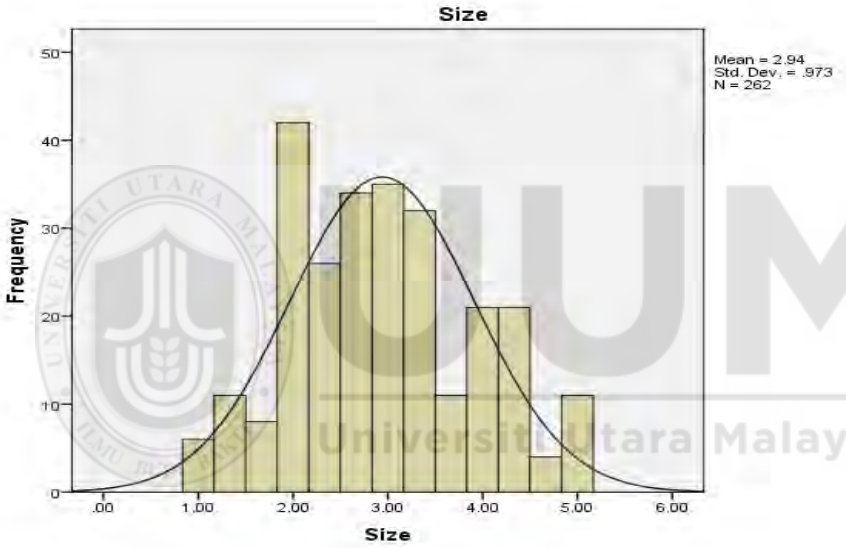


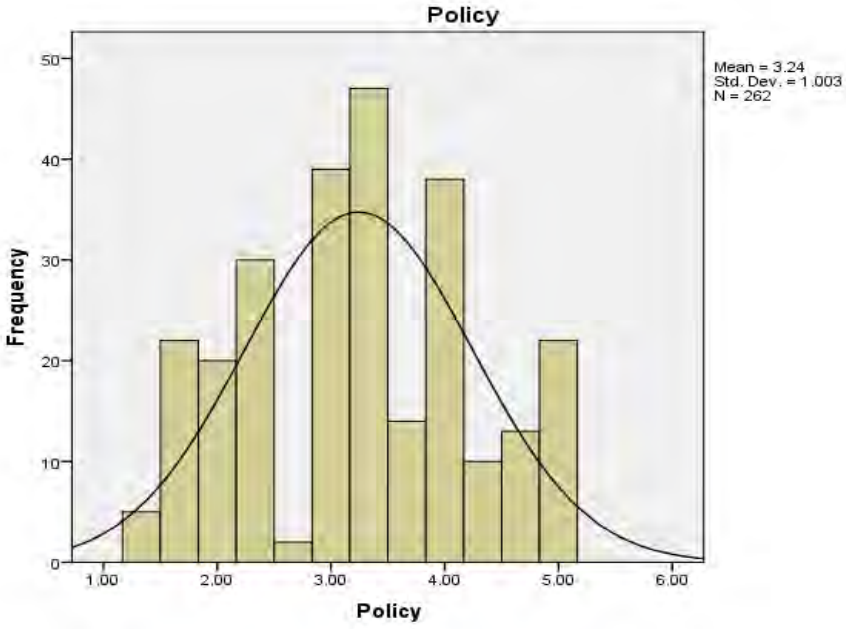


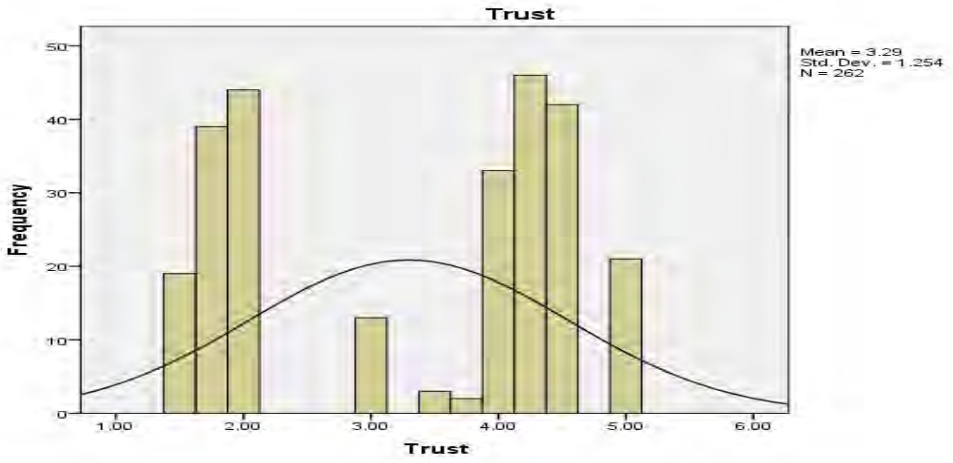


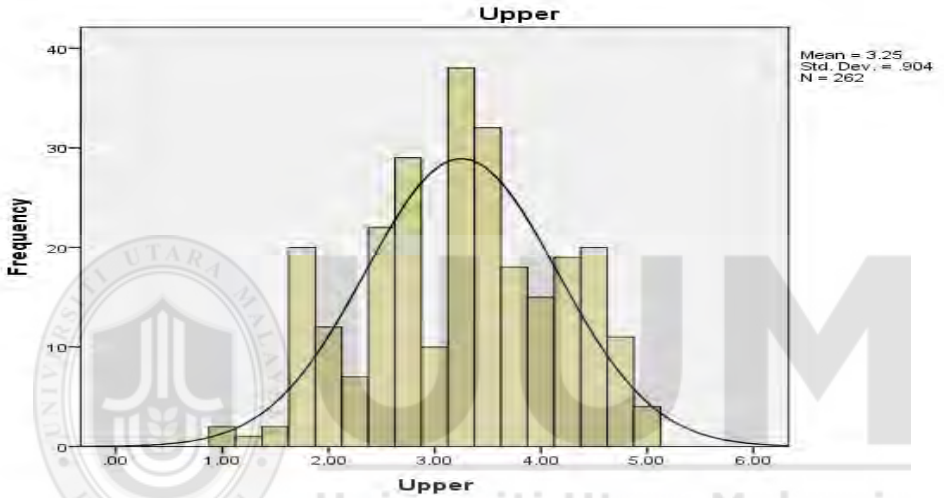


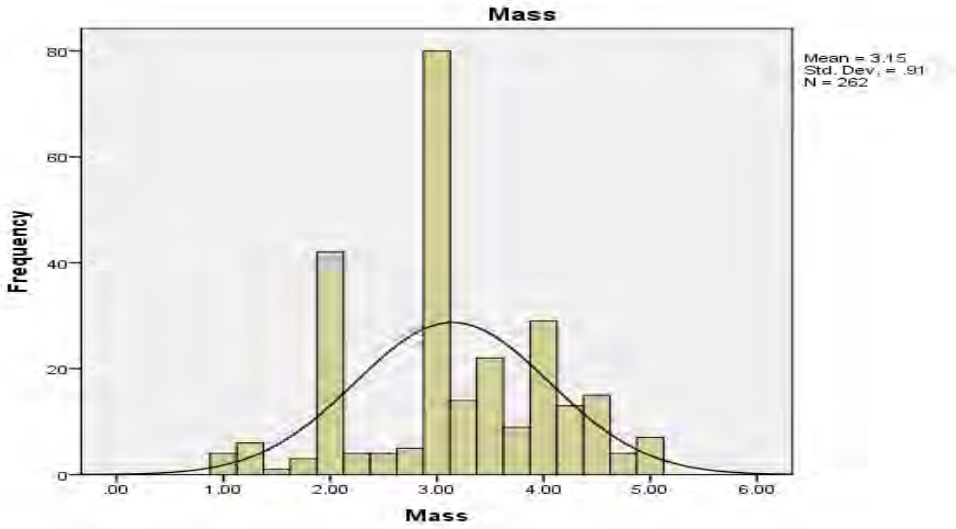


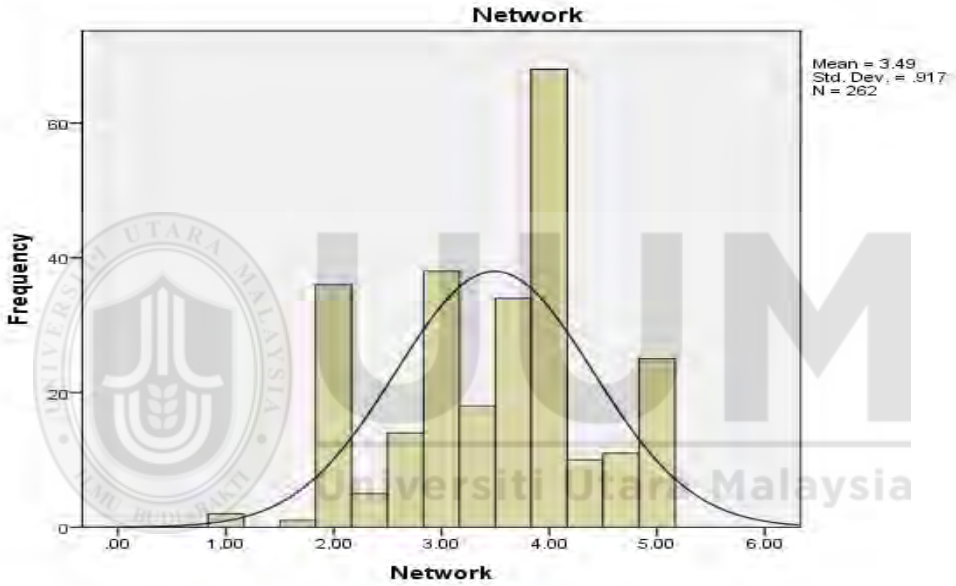


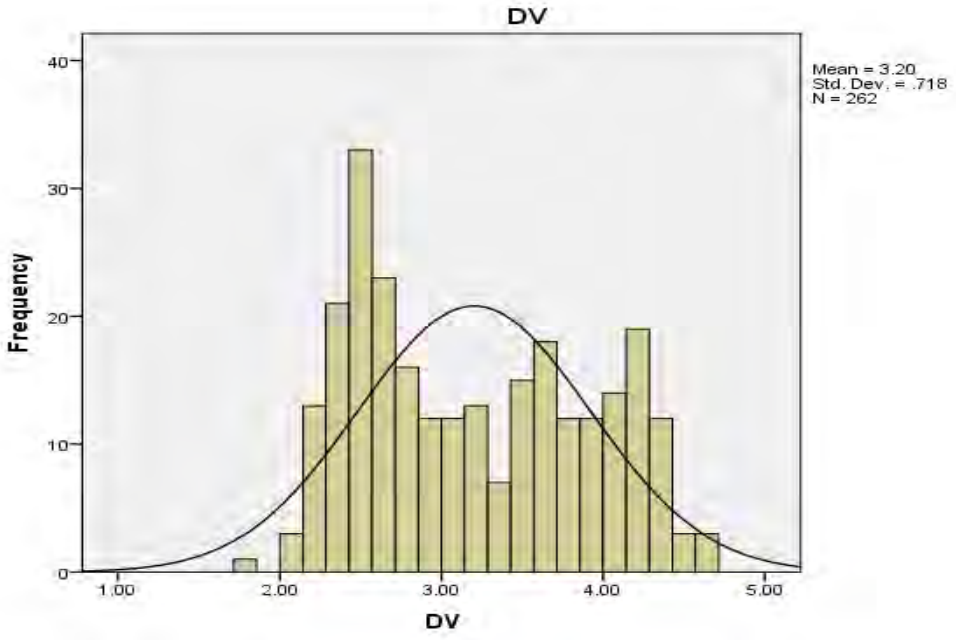












APPENDIX K

OUTLIERS RESULT

Descriptives

			Statistic	Std. Error
Risk	Mean		2.6023	.04296
	95% Confidence Interval for Mean	Lower Bound	2.5177	
		Upper Bound	2.6869	
	5% Trimmed Mean		2.6145	
	Median		2.7000	
	Variance		.484	
	Std. Deviation		.69536	
	Minimum		1.00	
	Maximum		4.80	
	Range		3.80	
	Interquartile Range		.80	
	Skewness		-.208	.150
	Kurtosis		.430	.300

APPENDIX L

PROFILE INFORMATION

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 30	55	21.0	21.0	21.0
	From 30 to 40	105	40.1	40.1	61.1
	From 41 to 50	76	29.0	29.0	90.1
	More than 50	26	9.9	9.9	100.0
	Total	262	100.0	100.0	

Level of Education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Bachelor	152	58.0	58.0	58.0
	Master	60	22.9	22.9	80.9
	PhD	34	13.0	13.0	93.9
	Other	16	6.1	6.1	100.0
	Total	262	100.0	100.0	

Years of Expreince

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	From 1 to 5	76	29.0	29.0	29.0
	From 6 to 10	82	31.3	31.3	60.3
	From 11 to 15	53	20.2	20.2	80.5
	More than 15	51	19.5	19.5	100.0
	Total	262	100.0	100.0	

Type of Position

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Administrator	155	59.2	59.2	59.2
	Administrator and Academic	107	40.8	40.8	100.0
	Total	262	100.0	100.0	

Level of Position

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Manager	78	29.8	29.8	29.8
	Responsible	55	21.0	21.0	50.8
	Employe	129	49.2	49.2	100.0
	Total	262	100.0	100.0	

APPENDIX M

DEVICES USAGE, PERCENTAGE, YEAR AND TYPES OF INFORMATION

Use Line and Mobile

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	11	4.2	4.2	4.2
	Less than one time in a month	39	14.9	14.9	19.1
	One time in a month	52	19.8	19.8	38.9
	Few times in a month	122	46.6	46.6	85.5
	Few times in a week	38	14.5	14.5	100.0
	Total	262	100.0	100.0	

Use E-mail

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	9	3.4	3.4	3.4
	Less than one time in a month	37	14.1	14.1	17.6
	One time in a month	76	29.0	29.0	46.6
	Few times in a month	105	40.1	40.1	86.6
	Few times in a week	35	13.4	13.4	100.0
	Total	262	100.0	100.0	

Use website

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	7	2.7	2.7	2.7
	Less than one time in a month	31	11.8	11.8	14.5
	One time in a month	87	33.2	33.2	47.7
	Few times in a month	98	37.4	37.4	85.1
	Few times in a week	39	14.9	14.9	100.0
	Total	262	100.0	100.0	

Use webcam

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	24	9.2	9.2	9.2
	Less than one time in a month	28	10.7	10.7	19.8
	One time in a month	95	36.3	36.3	56.1
	Few times in a month	65	24.8	24.8	80.9
	Few times in a week	50	19.1	19.1	100.0
	Total	262	100.0	100.0	

Access the database

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	262	100.0	100.0	100.0

PERCENTAGE OF SHARING INFORMATION

Precentage of Sharing information

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Zero	37	14.1	14.1	14.1
	From 1 to 20	59	22.5	22.5	36.6
	From 21 to 40	58	22.1	22.1	58.8
	From 41 to 60	67	25.6	25.6	84.4
	From 61 to 80	41	15.6	15.6	100.0
	Total	262	100.0	100.0	

YEAR OF SHARING INFORMATION

Years of Sharing information

	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	Zero	14	5.3	5.3	5.3
	From 1 to 20	59	22.5	22.5	27.9
	From 21 to 40	105	40.1	40.1	67.9
	From 41 to 60	44	16.8	16.8	84.7
	From 61 to 80	40	15.3	15.3	100.0
	Total	262	100.0	100.0	

TYPES OF INFORMATION

	Student information	Administratives taff information	Academic staff information	suggestions	Dispatches	Scholarship and studies	Policies and rules	Guidelines
Zero	14.1%	5.3%	1.9%	19.1%	16.4%	22.1%	3.1%	0.4%
From 1 to 20	22.5%	22.5%	9.9%	15.6%	22.1%	1.5%	24.4%	19.1%
From 21 to 40	22.1%	40.1%	41.6%	10.3%	6.1%	21.4%	16.4%	57.6%
From 41 to 60	25.6%	16.8%	26.7%	24.0%	27.5%	41.6%	46.6%	6.1%
From 61to 80	15.6%	15.3%	19.8%	30.9%	27.9%	13.4%	9.5%	16.8%
Total	100%	100%	100%	100%	100%	100%	100%	100%

APPPENDIX N

REGRESSION

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.098	.277		11.203	.000
	BenNew	.029	.076	.024	.380	.704

a. Dependent Variable: DV

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.501	.171		20.432	.000
	Risk	-.115	.064	-.111	-1.809	.072

a. Dependent Variable: DV

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.237	.133		24.367	.000
	Cost	-.010	.037	-.017	-.279	.781

a. Dependent Variable: DV

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.607	.132		19.795	.000
	ITcap	.206	.043	.284	4.775	.000

a. Dependent Variable: DV

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.076	.167		12.411	.000
	IQ	.319	.046	.395	6.940	.000

a. Dependent Variable: DV

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.550	.144		17.664	.000
	Compat	.196	.041	.281	4.728	.000

a. Dependent Variable: DV

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.467	.118		29.477	.000
	Complix	-.085	.035	-.149	-2.431	.016

a. Dependent Variable: DV

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.776	.195		14.215	.000
	DW	.132	.059	.137	2.237	.026

a. Dependent Variable: DV

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.021	.139		14.575	.000
	TMS	.374	.042	.482	8.874	.000

a. Dependent Variable: DV

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.966	.177		16.716	.000
	CC	.066	.048	.085	1.370	.172

a. Dependent Variable: DV

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.190	.142		22.518	.000
	Size	.004	.046	.006	.092	.927

a. Dependent Variable: DV

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.514	.144		17.467	.000
	Policy	.212	.042	.296	5.003	.000

a. Dependent Variable: DV

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.339	.111		21.012	.000
	Trust	.262	.032	.457	8.294	.000

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.585	.161		16.028	.000
	Upper	.190	.048	.239	3.967	.000

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.930	.159		18.403	.000
	Mass	.087	.049	.110	1.780	.076

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.242	.164		13.659	.000
	Network	.275	.045	.351	6.048	.000

APPENDIX O

MULTI REGRESSION

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.811[a]	.657	.643	.42865

a. Predictors: (Constant), ITcap, DW, IQ, Compat, Upper, Policy, Complix, Network, TMS, Trust

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	88.394	10	8.839	48.109	.000[b]
	Residual	46.118	251	.184		
	Total	134.511	261			

a. Dependent Variable: DV

b. Predictors: (Constant), ITcap, DW, IQ, Compat, Upper, Policy, Complix, Network, TMS, Trust

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.944	.241		-3.912	.000
	ITcap	.058	.030	.079	1.896	.059
	IQ	.172	.032	.213	5.389	.000
	Compat	.157	.026	.225	6.005	.000
	Complix	-.039	.022	-.068	-1.764	.079
	DW	.063	.036	.066	1.749	.082
	TMS	.236	.031	.304	7.580	.000
	Policy	.153	.027	.213	5.603	.000
	Trust	.183	.024	.319	7.568	.000
	Upper	.058	.031	.073	1.879	.061
	Network	.211	.031	.270	6.856	.000

a. Dependent Variable: DV

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.6673	4.6277	3.2019	.58196	262
Residual	-1.26536	1.01201	.00000	.42035	262
Std. Predicted Value	-2.637	2.450	.000	1.000	262
Std. Residual	-2.952	2.361	.000	.981	262

a. Dependent Variable: DV